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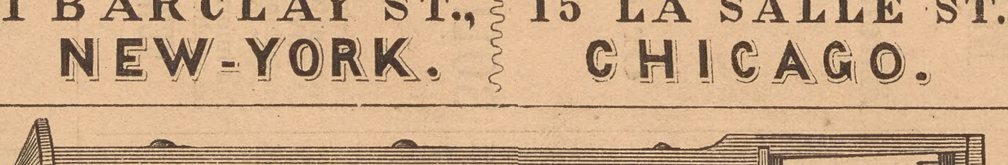
THE NATIONAL CAR BUILDER.

Devoted to the Interests of Railway Rolling Stock.

Vol. I. AUGUST, 1870. No. 2.

PUBLISHED BY
VOSE, DINSMORE & CO.
1 BARCLAY ST., NEW-YORK. 15 LA SALLE ST., CHICAGO.



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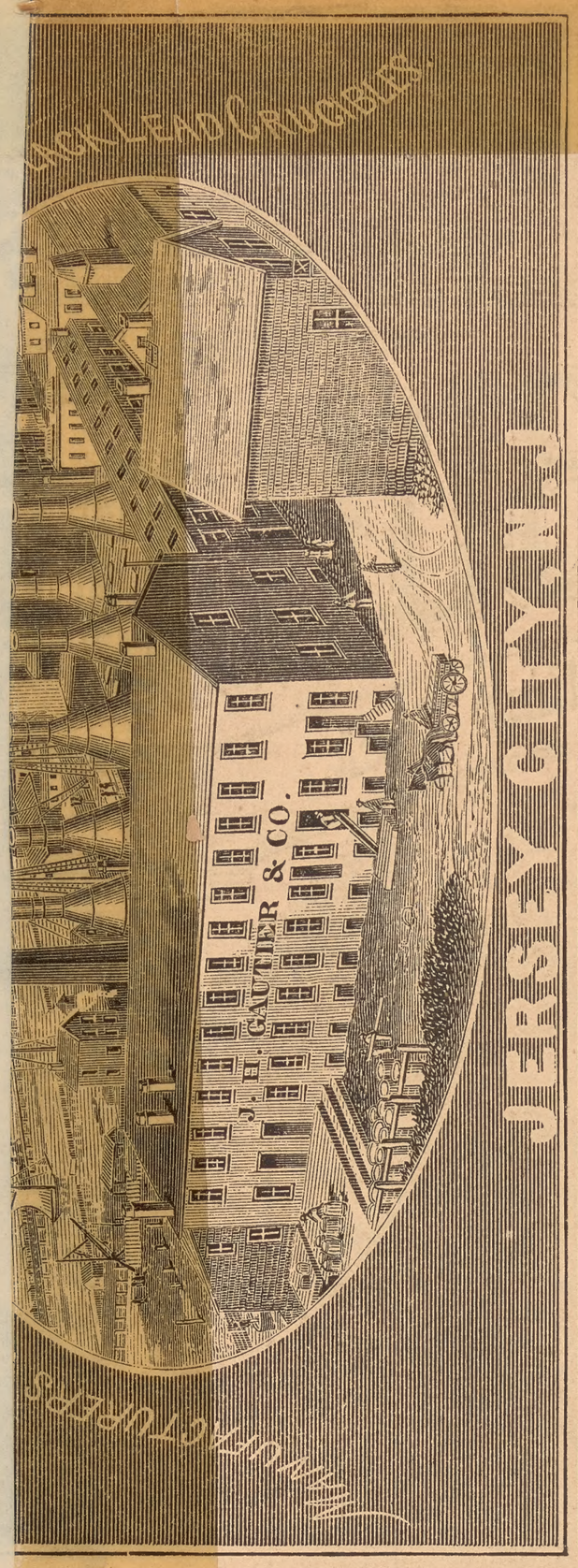

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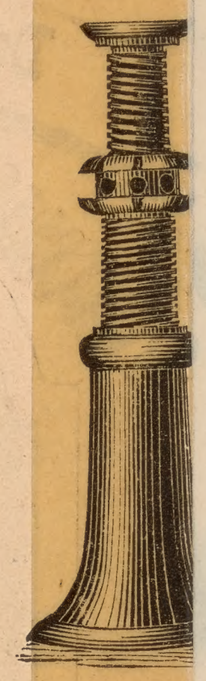

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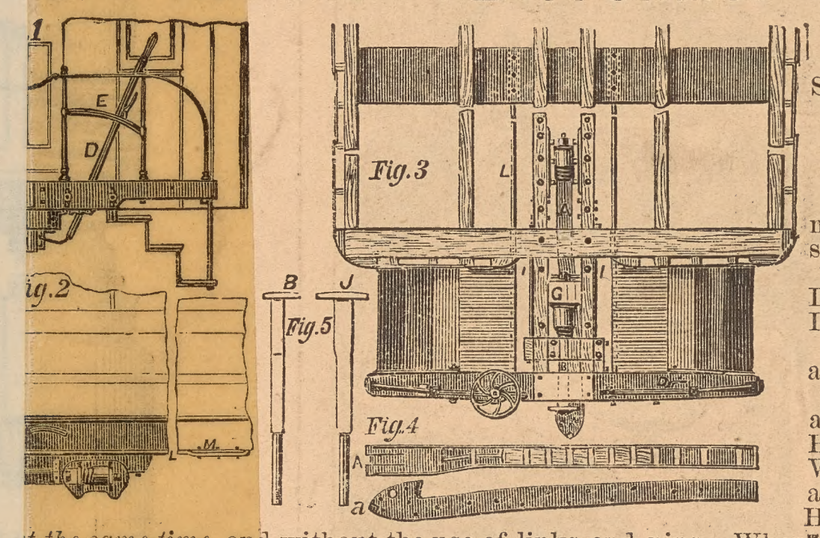

t the same time, and without the use of links and pins. When two cars are thus coupled together, the *head* of the *Hook* of each car is under the
se together (about 4 inches apart.) The effect of this is, *one platform cannot be forced over the other*, nor can a *child* fall between the platforms; t
ssion" makes the train run steadily, and prevents all jerking at starting and stopping.

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DESCRIPTION.

Figure 1 is an elevation; Figure 2, a longitudinal section; Figure 3, a plan of a
ment has been applied; and Figures 4 and 5 show top and side views of the "Hook
scale than that of Figures 1, 2, and 3.

The letters refer to the same parts in all the figures. A is the coupling "Hoo
D the "Lever," E the "Quadrant Ratchet," F the "Truss Beam," G the "Spring
I the "Upward Trusses," K the "Main Spring," L the "Downward Trusses," and
The Platforms, instead of being located below the centre line of the main sills
and held there by the Trusses I and L, so that the point of contact (in Buffers B) is *in*

The coupling "Hook" A is attached to the draw spring the same as the ordinar
above the track, but in such a manner that the outer end is free to move laterally
Hook projects beyond the platform. The Stop C is placed under the Buffer Beam
When two cars are brought together, the Coupling Hooks, from *their shape*, push
are compressed hard on the Buffer Springs, then—*the points of the hooks having pa*
Hooks are carried forward by their main-springs, and thus the "*Coupling*" and

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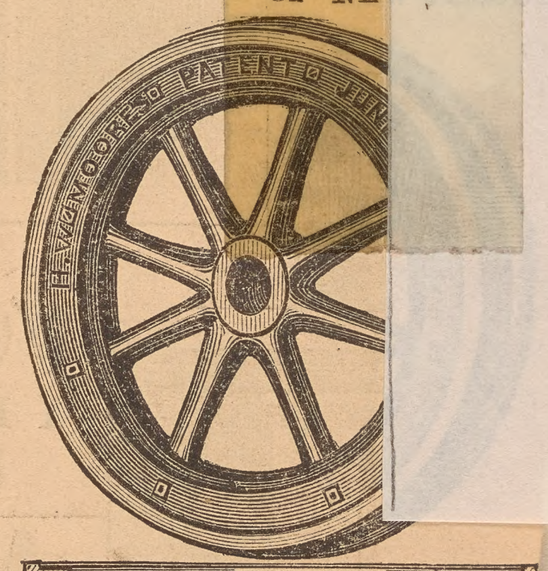

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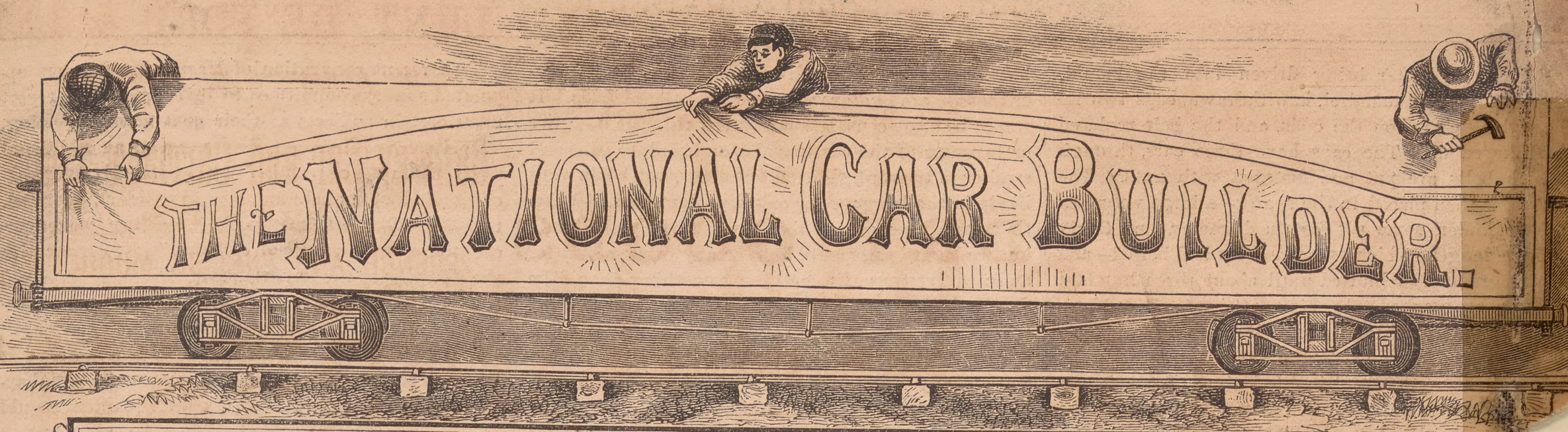

DEVOTED TO THE INTERESTS OF RAILWAY ROLLING STOCK.

Vol. I.
No. 2. } AUGUST, 1870. { 50 Cents per Annum.
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The National Car-Builder,

PUBLISHED MONTHLY,

BY

VOSE, DINSMORE & CO.,

1 BARCLAY STREET, NEW-YORK,

AND

15 LA SALLE STREET, CHICAGO.

Terms, 50 cents per Annum.

Editorial Announcements.

CORRESPONDENCE.—*We cordially invite the coöperation of the railroad public in affording us the material for a good mechanical paper. Articles relating to rolling stock and machinery, by those practically acquainted with those subjects, will be gratefully received. All communications must be addressed to Vose, Dinsmore & Co., No. 1 Barclay Street.*

The name and address of the writer must accompany all communications designed for publication.

ADVERTISEMENTS.—*A limited number of advertisements will be inserted on the cover. Rates made known on application.*

All communications in regard to advertising should be addressed to L. F. DINSMORE, *Post-Office Box* 4055, *New-York City, who is our agent for advertising, and authorized to make contracts, collections, etc.*

Take Notice.

We beg to call the special attention of Master Car-Builders and Master Mechanics to the subscription price of our paper. It is so very reasonable that we trust it will be an inducement for them to send us as many names as possible from each car-shop, so we can mail their papers to the address of the M. C. B., or M. M., in one package.

To Our Readers.

A MASTER car-builder at the South sends us the following:

"EDITOR OF THE NATIONAL CAR-BUILDER: Inclosed please find 50 cents, for which send me THE NATIONAL CAR-BUILDER. I have long desired to get a paper devoted to our interests. I only fear yours is on too small a scale. I would willingly give $20 a year for a journal that could furnish monthly such cuts and illustrations as would make it a standard authority with master car-builders. We can get books and periodicals containing every variety of style and design for houses, bridges, etc.; but as for a railroad-car, nothing has been done to elevate the ideas or improve the tastes of by far the larger portion of those engaged in their construction. Go where you will, the ideas of master car-builders are apparent in their work; and the style is often such as to reflect no credit on the designer, builder, or road. I hope you will meet with such encouragement as will enable you to enlarge your paper, and send out weekly or monthly from your metropolitan position such views, designs, and improvements, as will make every railroad manager feel that it is his duty to consult it."

We entirely agree with our correspondent as regards the necessity of a publication devoted exclusively to the interests of car-building, and containing such information as will cause it to be recognized and appreciated as a standard authority among all who are engaged in this special branch of mechanical industry. In view of this necessity, it is our purpose to do what we can to supply the wants of car-builders, by collecting from all available sources such facts and suggestions as will be of service to them in the prosecution of their business in all its various details. We are quite aware, however, that we can not at the outset do all we would wish in this respect, or make our paper all that our correspondent, or others such as he, would desire. We shall have to *grow*, and in order to do so, we must necessarily be subject to the conditions incident to every species of healthy development. We must labor day by day toward the result we aim at; we must have the active coöperation of all who are directly interested in the success of our undertaking. We doubt not that every practical mechanic who reads our paper, has some definite views of his own on some of the many details that go to make up the aggregate of a completely constructed car—some ascertained defect in existing methods, and the remedy therefor—some new design, improvement, or application of means that may not have occurred to any one else; and it is these isolated individual views and conceptions that we seek to draw out, and make available for the practical use of the mass of our readers. The great bulk of information and valuable experience possessed by individuals is of comparatively little account if suffered to remain a mere private possession. It must be sent like grist to the mill, put in the hopper, ground and bolted, so that whatever is valuable may be separated from what is worthless, and appropriated for the general benefit.

We say, then, to all practical mechanics interested in the business of car-building, let us have your ideas. Give us your views upon any and all subjects connected with your trade. This is the encouragement we need and expect. We can not make our paper what it should be, or what you have a right to expect, without this encouragement. Let us have items of news, hints, suggestions, any thing that is practical and will contribute to the great aggregate of information we desire to obtain and present to you in the columns of our paper. We do not expect every communication sent us will be faultless in style and diction, or embody suggestions that will command universal acceptance. What we want are the best results of experience and observation, including whatever is essential and valuable in mechanical adaptation, and calculated to secure all desirable requisites in car construction.

We appeal to every reader of THE NATIONAL-CAR BUILDER to aid us in the way we have indicated, and thus enable us to develop sources of information, enlarge our plans, and ultimately render our paper such a medium as will be satisfactory to ourselves, and indispensable to you.

Gum Springs.

OF the various materials used in the construction of railway-cars there are doubtless none of which so little is generally known as the India-rubber gum-spring, and the process of its manufacture. The crude rubber has become such an important article of commerce, and in its various modifications is applied so extensively to mechanical purposes, that a brief account of its production, and the process by which it is manipulated into car-springs, will, we doubt not, be interesting to our readers.

Much the largest portion of the crude gum imported into this country comes from Brazil. A considerable quantity is produced in the East-Indies; but the quality is inferior. The market is supplied with various kinds—fine and coarse Para, Central American, strip Central, Carthagena, Guayaquil, Java, etc. The finest quality comes from the Brazilian port of Para, and is the product of the extensive region embraced in the valley of the Amazon and its tributaries.

The gum, when received at the factory, is first cut up and passed through a washing-machine, where all the dirt is extracted. It is then sheeted out and hung over stretchers in a drying-room, which is warmed by artificial heat. In going through this process, it will lose from five to thirty-five per cent in weight, according to the quality of the gum used—some being, when purchased, comparatively pure and dry, and some filled with sand and water, and, in some cases, with particles of wood. The better the grade of gum, the less will be the waste. After it is thoroughly dried, it is weighed off in batches, say from thirty to fifty pounds, and a certain proportion of dry white-lead and bolted whiting mixed with it. This is done in a machine consisting of two cylinders or rolls, about fifteen inches in diameter, heated by steam. Between these rolls the gum is passed, along with the lead and whiting, until the parts are thoroughly mixed and ground, when the proper amount of sulphur is added. This ingredient is not used for the purpose of adulteration, but is merely a vulcanizing agent, its action being analogous to that of yeast in bread-making. The mass or batch of gum, which now resembles putty somewhat in appearance, is next put into a warmer—a machine similar to the mixer—and kept in a condition for the calender—another machine, with three large cylinders some four feet in length and two feet in diameter. These cylinders or rolls are kept heated by steam; the gum is put between them, and rolled out into sheets of about one sixteenth of an inch in thickness, and then passed to a mandrel, (which corresponds to the size of the hole in the spring,) and wound up until the required diameter is obtained. The ends of the roll of gum thus formed are then trimmed off, and the entire roll thoroughly coated with soapstone dust, to prevent its sticking to the mould into which it is then placed; this mould is twenty-four inches long, the iron being about an inch and a quarter in thickness and the inside diameter the same as that

of the roll. After being driven into the mould, the iron bolt, or mandrel, is withdrawn, caps two inches thick placed on the ends, and the bolt replaced and keyed up. The caps have three ears, through which bolts are put and fastened with nuts. The mould is then placed in the heater—a large wrought-iron cylinder, some six feet in diameter, and thirty feet in length, which is headed up and bolted—and steam gradually admitted until about three hundred degrees are reached. In this condition the mould remains from four to ten hours, being carefully watched. The time is determined by the size of the spring; one of small diameter requiring less time than a larger one. When properly cured, the mould is taken from heater, and, when cooled, the caps are removed, the spring taken out and placed in a lathe, where cut into the required lengths. The springs thus formed are ready for shipment.

A rubber spring, when properly made, is, without doubt, the best for the purposes required of any that has thus far been produced; but, when improperly made, it is one of the poorest. The materials which enter into its composition are liable to adulteration to a very great extent by the admixture of base ingredients, which impair its elasticity and durability, thus confirming the truth of the maxim, that the cheapest is by no means the best. Springs can be made to weigh less by using less lead and more whiting in their manufacture; and the essential qualities of the spring are impaired just to the extent to which this is done—the lead having a metallic and durable body, and the whiting a perishable one. The best springs are made by using good Para gum with a suitable admixture of fine sheet Central, or Carthagena, and a proper proportion of white-lead and whiting. Some idea of the extent of the adulteration of low-priced springs may be formed from the fact that fine Para gum is worth in the importer's hands $1.07 per pound, and sheet Central 60 cents per pound; while the manufactured spring is sold at 40 to 45 cents per pound.

The subject is capable of greater elaboration than our space will now permit; but the few points we have thus concisely presented will serve to indicate what should not be lost sight of by car-builders, and others who have occasion to use the gum spring.

Dust in Passenger-Cars.

One of the greatest annoyances to which the traveling public is subjected, especially during the warm season, arises from cinders and dust; and any remedy therefor, even though it be a partial one, would be a much desired boon. A very simple and effective device for diminishing the quantity of dust which enters the car while in motion, is to attach to the outside of the car, at the side of the window, a projecting piece of wood or glass about four inches wide and twelve or fifteen inches long. The dust, striking against this, is intercepted and prevented from entering the window. These pieces can be attached to each side of the sash, projecting at right angles from the body of the car. A plan similar to this has been adopted for private carriages to protect the occupants from rain and mud, and has proved very effective; and there seems to be no reason why its benefits should not be extended to railway passengers, who are much more exposed to the dust nuisance, and whose sufferings in the aggregate are much greater.

Drawing-Room Cars.

The luxurious accommodations of these vehicles are, we doubt not, fully recognized and appreciated by the traveling public at all seasons of the year, except midsummer, when the "heated terms" visit us, and the pleasure-seeking epidemic prevails with such virulence. At this particular time every body must go somewhere. A comfortable home is delightful except when the dog-star rages. *Then* it is unbearable, and we must travel. But we wish to travel comfortably; and so, regardless of expense, we invest in a drawing-room car ticket; but long before we reach our destination, we discover that we are immured in a sort of palatial oven. It would be some consolation to know that the designer or inventor of the car was also on board, to pant and swelter in the air-tight compartments, but he is very likely in the baggage-car enjoying the breeze. Whether we are correct in this surmise is not material; but we beg to suggest to him or any other person of an inventive turn of mind, that something should be done to improve the ventilation of drawing-room cars; otherwise, the ordinary car, with all its inconveniences, is preferable for summer traveling. We do not suggest any particular method of remedying the evil, but merely wish to call the attention of car-builders to the subject, feeling confident that a little thought and ingenuity expended thereon will be productive of good results.

Solid Contents and Weight of Cylindrical Bodies.

In making estimates for contracts, the master car-builder can, with the greatest facility, calculate the cost of lumber, iron, and other materials pertaining to construction, by rules that are simple and accurate; and, as a method has often been asked for, by which the weight of rubber springs, of any height, diameter, and hole, may be ascertained, the following rule will enable any contractor to make an approximate estimate:

A rubber spring, based upon the present compound weighs 1 ounce to the cubic inch, and can be made to weigh more or less according to the proportion of its components, which affects, of course, the quality of such springs; however, the weight per cubic inch being given, the weight of a cylindrical body will be ascertained thus:

By a geometrical demonstration, the area of a circle of which the radius is 1 is 3.141592; hence, taking this as the basis, multiply the square of the radius (which is one half of the diameter) by 3.1416, and the result will be the area of the base, which, multiplied by the height, determines the solid contents. The hole through the cylinder must be calculated in the same way, deducting the result from the solid contents, and then divide the remainder by 16, (16 ounces,) which gives the weight.

Another very good method is to multiply the square of the diameter by .785398; multiply the product by the height, which gives the solid contents, and proceed as in rule above.

In our last issue we inadvertently referred to F. D. Adams as heretofore having charge of the freight-car department of the Ohio Falls Car Company. We should have said that he was superintendent of the works of that company.

Alexander H. Lewis, Vice-President of the Ohio and Mississippi Railroad Company, died in Cincinnati on the 3d inst., of consumption. Mr. Lewis was born in Edwards County, Illinois, in 1822, but early in life removed to Cincinnati, which was his home for most of the time thereafter. He commenced his railroad experience as a conductor on the Little Miama Railroad, and eventually became assistant superintendent of that road, in which capacity he was associated with William H. Clement, the president of the road and one of the most successful and capable railroad men in the country. Subsequently they both went to the Ohio and Mississippi Railroad, Mr. Lewis in the capacity of superintendent, from which active position he was only a few months ago promoted to that of vice-president. The Cincinnati *Commercial* says of him: "None who knew him well, not to say intimately, could fail to recognize in him extraordinary qualities of self-command under all circumstances, the mildness and kindness of an even temper, and a genial disposition. Those associated with him in business knew him as an indefatigable and untiring worker, always true as steel to interests intrusted to him, and exacting, but not beyond the point of justice, in his demands upon those under him."

The recent convention of Master Car-Builders appointed sundry committees to investigate and report upon certain subjects at their next annual meeting. The *American Railway Times* suggests an additional topic which the convention have apparently overlooked or did not include among the topics enumerated, namely, "The best methods of framing passenger-cars to resist the effects of collision." We concur with the *Times* as to the importance of this suggestion, and trust it will receive the attention of the proper committee. The vicious practice of sacrificing strength and durability in order to save expense—or what amounts to the same thing—making mere external appearance subordinate to more essential qualities, should be discountenanced in car-building. A railway passenger-car should be something more than a cheap and showy piece of finery. The safety of the traveling public, no less than the financial and buiness interests of the roads themselves, requires that every car should be constructed in a manner adequate to the service designed. Any thing short of this, either as regards the material or the use made of it, is a species of deception inherently vicious in itself, and involving danger to life and limb. We trust this matter will not be overlooked by the various committees which are to report upon kindred and collateral topics at the next annual meeting.

Edward H. Williams, late General Superintendent of the Pennsylvania Central R.R., has recently been appointed Superintendent of the Baldwin Locomotive Works, of Philadelphia. His long experience in his former position, his thorough acquaintance with the wants of our railway system and the practical details of railway construction, combined with popular personal qualities, will render him an efficient manager in his new capacity. He brings to this special branch of railway equipment—the construction of locomotives—special qualifications in the matter of experience and mechanical knowledge thereby acquired, which peculiarly fit him for the position he now fills.

The *Railway Times* says the Baldwin Locomotive Works "employ about seventeen hundred men, to whom the sum of about $150,000 is disbursed every month. Many of these men are heads of families, living in their own houses and in dwellings for which they pay rent. This little army of consumers is clothed and fed to the profit of the traders and manufacturers of Philadelphia. These men contribute of their thrift to replenish the public treasury. They are patrons of public schools, and contribute their share to the maintenance of public worship. Their skill and industry, united with the sagacity and enterprise of the proprietors, have made the Baldwin Locomotive Works famous among like enterprises. The establishment is a prominent feature of Philadelphia manufacturing enterprise, its sales, we believe, reaching an aggregate annually of $5,000,000. The wages paid, as will be seen by the aggregate of the monthly pay-roll, are liberal; and if any be curious to see how these men and their families live, they will find them well housed, clad and fed, and in the main intelligent, well-to-do people."

We call attention to the advertisement of *The William Butcher Steel-Works*, of Philadelphia, which will be found on our cover. The New-York office is 59 John street. Samuel Huston, the president of the company, is a resident of Philadelphia, wealthy, enterprising, and possessing excellent business capacities. The superintendent, William Butcher, is a practical steel-maker, and for his energy of character well deserves the success he is reaping. The treasurer, H. P. Rutter, is a well-known railroad officer, and brings to his work great experience. The general agent, William Toothe, has recently connected himself with the house, and will prove a valuable acquisition, combining business ability with popular and genial personal qualities which have already made him widely and favorably known. The works are growing rapidly

since the company have made their own blooms, instead of importing them. The product is purely American, embracing a great variety of articles needed in railway construction, among which should be specially noted *car-axles.* The *personnel* of this company, their mechanical skill, and thorough knowledge of the wants of our railways in the line of their business, will, we doubt not, secure for them a liberal share of patronage.

New Publications.

The Cabinet Maker is the name of a new weekly quarto paper, published in Boston, and devoted exclusively to the interests of cabinet-ware, upholstery, and kindred trades. It is well printed, and contains a choice variety of original and selected articles interesting alike to the general reader and to dealers and manufacturers. Its aim will be to present a weekly compendium of news pertaining to this branch of industry, combined with such illustrations, explanations, and criticisms as will excite discussion and tend to benefit the trade, by improving the style and quality of furniture and upholstery wares.

WE have received the first number of *The Engineer,* a semi-monthly publication, issued by Lewis & Valentine, 19 Cortlandt street, and devoted, as its name imports, to the engineering and mechanical enterprises of the day. It is well printed from new type and on good paper, and contains an interesting variety of articles and illustrations pertaining to machinery and discoveries, and improvements therein. Its design is to promote the interests of mechanics, manufacturers, inventors, and engineers, without partiality or favoritism, relying on its merits for recognition and support. We wish it success.

Railway Car-Heating.

Now that warm weather is at hand, railway travelers will care more for ventilation than for warming of cars, but in a few months the reverse will be the case, and warmth will be sought, under present arrangements, at the cost of closed windows and ventilators, and consequently vitiated air. Perhaps the intervening heated term could not be better applied by the numberless inventors of railway improvements than in considering the most feasible methods of car-warming, the defects of the systems hitherto suggested, and the best modes of applying scientific principles to the strictly utilitarian purpose under discussion.

Many systems of heating cars succeed only in inducing an undesirably high temperature in the upper part of the car, around the heads of the passengers, while that adjacent to the floor and occupied by the lower extremities, has an equally uncomfortable frigorific tendency. This arises in the greatest degree from any attempt to use heated air from registers as is done in dwellings, the air rising continually and being displaced by colder air below. When the heated air is forced downward in currents, for instance, by the forward movement of the car, this may be remedied when the train is in motion, but becomes aggravated by its stoppage or any considerable diminution in its speed. There is, moreover, even a greater objection to this plan in the well-known difference in the action upon the human system of heat communicated from air, and that radiated from a more highly heated source. In the one case, the air being in practice necessarily measurably lower in temperature than the body, a radiation of heat from the body is continually going on. With heat radiate through the air instead of derived from it, the temperature may be greater than the body, and loss of heat from this last avoided. From this it follows that radiators arranged along the floors of cars and in suitable relation with the seats promise, and indeed have given, the best results, as evidenced by trial on the Lake Shore and some other roads. The best manner of constructing and operating these radiators, however, is a matter as yet unsettled. Steam-pipes leading from the locomotives, and connected by flexible joints at the car-couplings, have been often proposed; but the risk from any considerable pressure, and the loss from leakage at the joints, are only two of numerous objections to the plan. These apply as well to the use of hot air in the same way. Hot sand is said to be employed in Sweden for the purpose. The details of the arrangement made use of are not at hand, but it is easy to imagine a stream of the sand heated by a furnace and caused to traverse slowly through the radiator-pipes by appropriate mechanism. The construction of the mechanism of the couplings through which the sand would have to pass from car to car, and of the radiators, which would need to be simple, with few bends or narrow passages, would call for much invention and experiment, and practical difficulties might, perhaps, nullify the theoretical advantages which the sand certainly has for the purpose indicated as compared with the fluids, air, steam, or water. Whatever form of radiator is employed, it will furthermore possess the obvious superiority over the influx of air heated previous to entering the car, that the ventilation of the upper part of the car will involve a much less loss of heat. That cars are not both better heated in winter and ventilated in summer is a standing reproach to our railway management, and for it there are two causes. The first, the reluctance of corporations to adopt new appliances, can be more easily overcome than is commonly supposed; if the second, the incompleteness of many really good plans, is done away with by needed improvements in the minor points and details either in their construction or their manner of application.—*American Artisan.*

Construction of Passenger-Cars.

A GREAT majority of the passenger-cars running upon our roads are very insecure, and incapable to resist the effects of an ordinary collision. They are very tasty affairs with their gilding and fancy paint; but if some portion of the expense of these adornments could be used for the purpose of giving additional strength, it would be a vast improvement. There is very little satisfaction in being crushed in one of these gilded murder-traps, when we reflect that, if the expense and pains to render them elegant, light, and airy, had been taken to render them strong and secure, the crushing need not have happened. These flimsy structures are the instruments of a great deal of needless destruction to life and limb, and in the end very expensive to the railway companies. Some of the managers favor these shabbily-made and insecure cars because they desire to get rid of useless dead-weight; but it must be remembered that dead-weight may be useful when it gives security against disaster; and we must remember that weight, when properly applied in such structures, gives strength, and strength can not be had without it. The framing, especially the floor framing, of a large proportion of all passenger-cars is deficient in strength. The cars built at the shops of the Boston and Lowell line have, in addition to the outside longitudinal sills, six heavy floor-beams running the whole length of the car. These, when properly stiffened by the intermediate cross-pieces, and bolted and secured as they should be, give a platform that it would seem almost impossible to double up or crush together in case of collision. Some years since, a broken axle sent a wheel through the bottom of a car, tearing away the entire flooring. A passenger seated directly over the broken floor had the presence of mind to grasp the sill of a window, and saved himself from destruction. Since then Mr. Winslow, the Superintendent, has had wide strips of four-inch white oak plank fastened over the wheels to guard against that possible danger. Although the accident has not been repeated, there can be no doubt that it has been most effectually guarded against for the future. This and the extra timber for the frames make a pretty heavy car. Some of them weigh nineteen tons, but the weight is utilized for strength, which is eventual economy, and the same precaution should be taken on all the roads. There is a great deal of nonsense talked about the dead-weight of rolling stock, especially in passenger-cars, which is entirely out of place, so long as our managers are content to run locomotives with four or five tons weight upon each wheel. If some passenger-cars weigh twenty tons, and a full load of passengers weigh six tons more, it only gives three and one quarter tons weight upon each wheel of an eight-wheeled car, which certainly is not an objectionable amount, so far as the wear of the rail is concerned, or the amount of power expended in hauling; and it is practical economy if this extra weight secures comparative freedom from disaster in cases of collision or other accident.

The time is not far distant, probably, when passenger-cars will be made of iron or steel, and that, too, without any increase of the non-paying weight. The iron car will have these advantages: they can not be burned, and the passengers can not be transfixed with splinters of wood in cases of collision. There have been already one or two iron passenger-cars built in this country, but they were crude and ill-digested in design, and not looked upon favorably either by managers or the public. One of these, after being tried upon several roads for a while, finally passed into the possession of the Eastern Railway Company, where it has been in use for some years as a smoking-car in one of the local trains. The seats of this car had wooden frames, and a portion of the other inside work was of wood, an objectionable feature, which might be banished from wooden passenger-cars with profit. The iron freight-cars on the New-York Central line were found to possess all the necessary strength, one of them running through a heavy brick wall with only a bad dent on the corner, which a boiler-maker soon put in order. For some kinds of freight, the metal was found objectionable. An iron passenger-car of cylindrical form has been built in England, and a patent has been secured for the design. The plates are riveted on annular ribs, which serve as a frame to support the plates, and are likewise used for ventilation; the body of the car is likewise stiffened longitudinally by angle-irons and roof-plates, as well as by the floor-supports, and a system of semi-tubular strips running on each side of the car below its midwith. It is claimed that in case of a collision this arrangement is much safer and stronger than a car made of wood, while the weight is no greater. One feature of this car is the platform at the ends: it is stuffed with springs, cork, or rubber, and so arranged that in case of collision it will be compressed into one half size before the shock can act upon the body of the car. Under such a system it would seem almost impossible for any "telescoping" of cars, and very little danger of the passengers being crushed in case of collision. This question of iron passenger-cars would be a very proper subject of discussion at the next annual meeting of the Master Car-Builders' Association at Richmond, and so would some of the other matters of practice to which we have referred.—*American Railway Times.*

Broken Axles.

IN the late annual report of L. J. Fleming, Chief Engineer and Superintendent of the Mobile and Ohio Railroad, after saying that accidents from defects in machinery, except from broken axles, had diminished, the following remarks on the causes and prevention of broken axles are given:

"The accidents from broken axles, principally under tenders, may be ascribed to two causes—the granulating effect of the heavy, rigid rail when laminated, and the very bad quality of metal of which axles are frequently made. Manufacturers generally believe there is no method of testing the quality without breaking the axle, and when accidents occur, that they will be attributed to the effects of granulation from vibration and impact; and that there is no means of tracing them to the bad metal of which they are made. For some time past all new axles have been ordered of sufficient length to take a fracture from each end, and one or two of each lot has also been broken in the centre. The result of these tests has

been to return to the makers three fourths of those ordered within the past year. In future orders, the names of the makers will be required on each one, and the proper credit or blame will be given in the annual reports. The person who manufactures a bad axle, on which the lives of so many passengers depend, whether it is done intentionally or from the want of a proper knowledge of making it, is as culpable as the person who places an obstruction upon the track to throw off the trains."

The same report also contains the following in regard to *trucks:*

"As some objections have been raised by connecting roads who wish to exchange freight-cars as to the policy of this company, which refuses to permit any but swinging-beam cars to run on the road, the following extract is made from the annual report of 1867:

"The *truck* is one of the peculiar characteristics of American railways; and, with few exceptions, is not used in other countries. Its invention was the legitimate result of the imperfection of American tracks, and it was designed to permit the wheels to adapt themselves to the sinuosities of the track, while the line of traction would conform to the general direction of the rails. The importance of these principles is so well recognized that, *without exception, all passenger-cars* are constructed practically 'centre-bearing,' and the bodies suspended on the trucks, allowing them to vibrate freely, and the wheels to follow the irregularities of the track.

"Although these principles are so well recognized as indispensable to safety of passenger-cars, they are not generally applied to freight-cars, except upon southern roads. Of the connecting roads who use the swinging-centre trucks, are the New-Orleans, Jackson and Great Northern, the Mississippi Central, Vicksburg and Meridian, Selma and Meridian, Illinois Central, and Louisville and Nashville. The experience of this company during the war—when cars from almost every southern road and of almost every pattern were used—justifies the refusal to permit rigid trucks to be run on the road, even if the plainest principles of mechanics and common sense did not demonstrate the greater safety of the swinging-beam truck."

How to Make a Perfect Boiler.

THE following rules to be observed in making a perfect boiler come from a correspondent of the *Scientific American.* They might be enlarged somewhat, but are good enough so far as they go: First, the iron in each cylinder should be of uniform thickness and of good quality, and a templet made corresponding with the thickness of iron and size of boiler. Each plate should be marked off with a marking-punch from this templet. (I do not approve of using a pencil or white-lead for marking.) There should be a centre on the press-punch to enter the mark indicated by the marking-punch. This will make every hole in the boiler so perfect that a reamer will not be required. Secondly, the rings should be so laid out that, by driving a pin in each of the lap-holes, both rings will be closely hugged together. To make good holes the punches should be largest at the end, and tapering back, with the face a little concave, so that the edges touch the plate first. When the punch becomes dull throw it in the scrap-heap; it will not pay to repair or reharden it. Thirdly, all flat surfaces of boilers should be braced to sustain a pressure equal to the bursting-pressure of the cylinder; the braces being in all cases straight, so as to take a direct and positive strain, fitted of the exact bevels of the plates and riveted when possible, never using pins, as they are liable to work loose; for, in my opinion, this evil has caused the destruction of many boilers. Use the *best American iron;* thanks to protection, we can now produce an article equal to the best in the world. The edges of plates should be planed, not chipped, and the riveting and calking done by experienced workmen. For working pressure, Haswell's rule should be the guide, as it is more accurate than any I have ever seen. The boiler should be in charge of a *sober,* intelligent, industrious man; then there will be no fear of explosion.

As bituminous coal is now much used, would it not be economy, to say nothing of the abatement of a great nuisance, to consume the smoke? I think also that if the water were sufficiently heated to disengage impurities, and injected into a receiver, beneath the fire-box, it would be attended with benefit; there would be little or no commotion, and the water would then flow into the proper channel, and leave impurities where a blow-pipe would carry them off. I think both these results can be effected.—*Railway Times.*

A Novel Invention Adopted by the Hudson River Railroad.

AN exceedingly valuable invention, being an improvement, by the officers of the road, on the English system of taking water in the tender while in motion, has just been perfected, and is in successful operation on a number of locomotives. By this the fast trains run from New-York to Poughkeepsie, seventy-five miles, without stopping. Its cost is but trifling, and it will be attached to all passenger engines as speedily as possible. A trough is located in the centre of the track, 1200 feet long, 18 inches wide, and 15 inches deep, supplied with water from a spring, and capable of holding some 16,000 gallons. A cast-iron pipe, placed in position under the hind truck of the tender, and operated by a lever from the foot-board, takes up the water while the train is going at the rate of thirty-five miles per hour. About two thousand gallons—the full capacity of the tender—is taken up in two thirds the length of the trough. The company have already commenced the construction of a similar trough on the upper division of the road, and when completed, trains will be run from New-York to Albany, making only the stop at Poughkeepsie for change of engines.

Bridal-Cars.

A FAIR correspondent requests us to denounce "bridal cars" on railroads as "coarse indecencies" that a "proper modesty ought to be ashamed of." There can be no doubt of the fact that, to any but a prurient mind, the special fitting up of "bridal" cars for railways, "bridal state-rooms" on steamboats, and "bridal-chambers" in hotels, is simply a great indelicacy, to use the mildest term we can apply to it. A virtuous woman is not supposed to lose her modesty because she becomes a bride, and a modest woman finds the ordinary circumstances of her wedding a sufficiently trying ordeal to go through without the added publicity, the notoriety-courting announcement given to the vulgar crowd of her novel position, by her transfer to one of these "bridal" arrangements. The bride must be almost insensible to that timorous diffidence which should be one of the leading charms of her nature, if she can unblushingly run the gauntlet of obscene eyes on her path to such ostentatiously public "bridal" arrangements; and he must have a very indifferent conception of womanly purity who can provide arrangements of the kind so pretentiously provocative of licentious criticism. That is our view of such "luxuries," and we hope our fair correspondent coincides with us in the premises.

A Wholesale Merchandise Car.

MESSRS. A. H. BURHAUS and G. A. MCARTHUR, of Burlington, have just completed the model of a novel invention, designed to be a traveling dry goods and grocery house by rail. The *Hawkeye* says the model itself is a curiosity, having been made at the Pullman Palace Car-Works at a cost of $135, and shows the design of a half-section of a car of the length of a Pullman drawing-room and sleeping-coach. Upon the sides of the car are shelving, and deep drawers upon wheels, folding counters, etc., for the storing and exhibiting of goods. Beneath the floor is an apartment with trap-doors of sufficient depth to receive a bolt of muslin on end, and in sufficient quantity to stock any number of country stores. In the centre of the car is a cashier's desk, while at each end are private state-rooms, sleeping-berths, etc.

New Refrigerating-Cars.

THERE has just been put on the New-Jersey Railroad a new refrigerating-car, designed on a new plan, for the transportation of meat. The car is thirty by eight feet, and has a capacity for the meat of thirty head of cattle. It has double sides and ends, and between the outer and inner walls the space of three inches is filled with cork. The inside of the car is lined with zinc throughout. Near the roof at each end are gratings, upon which is placed the ice, from three to four tons being required for the passage. The cold air is pressed downward, and encircles the meat which is hung in the car, and, taking the impurities it is continually throwing off, carries them to the upper part of the car at the centre, and thence back to the ice, where the drippings are forced off through a pipe running to and through the bottom of the car, and there runs off. In the centre of the car, in the top, is a fan or windmill, which, when the car is in motion, is constantly revolving, and forces in air, which adds to the pressure to distribute the air coming from the ice. The meat is kept perfectly dry, and is said to be in a better state than when first dressed.

Number of Nails in a Pound.

THE following is a useful table, showing the length of the various sizes of nails and the number of each in a pound:

Size.	Length.	Number.
3-penny,	1 inch,	557 per pound.
4	1 1-4	253
5	1 3-4	232
6	2	167
7	2 1-4	141
8	2 1-2	101
10	2 3-4	98
12	3	54
20	3 1-2	34
Spikes,	4	16
"	4 1-2	12
"	5	10
"	6	7
"	7	5

How to Unload Gravel-Cars.

A LABOR-SAVING contrivance for this purpose, now in use on the Southern Minnesota Railroad, is thus described:

"The invention consists of a mammoth double mould-board plow placed upon the rear car of the train, which, when loaded by the usual gang of men, is conducted to its destination, where by simply uncoupling the engine from the train and coupling to the plow, which is done by means of a long cable that traverses the length of the train, the engineer whistles 'on brakes,' the engine and plow move forward, the train remains stationary, and the gravel is quickly and neatly discharged on the track. So one engine and set of men keep two trains of cars moving, or, in other words, do double the work formerly done with the same expense. On the occasion spoken of, the conductor took a loaded train from the gravel-pit out upon the road, something over half a mile, unloaded it and returned to the pit in eleven minutes and a half, where he found the other train loaded and in readiness to move out."

THE Murray Iron-Works of Burlington, Iowa, are increasing their capital stock, and propose to establish extensive car-works in addition to their present operations.

THIRTY thousand coal-cars are used by the Lehigh Valley and the Lehigh and Susquehanna railroads.

Communications.

A Few Facts for Railway Officials.

EDITOR OF THE NATIONAL CAR-BUILDER:

DEAR SIR: I was recently in a railway repair shop in which were several cars undergoing repairs, when the master car-builder remarked to me that these cars were always in the shop, that they were not half built in the first place, and the cost of repairs had already exceeded the original cost. I inquired of him how long they had been built. He replied, nearly four years. I then asked why he did not have them properly constructed in the first place; and his reply was, "I knew nothing about them until they were nearly finished, when I was ordered to go and inspect them. I did so, and pointed out their defects; but the superintendent said no change could be made, as the lumber was all out, and a part of the cars nearly completed. This should have been attended to when the contract was made. If you had consulted us before the lumber was cut, the cars could have been built in accordance with your instructions, for the same money. I returned to my shop, knowing the company had thrown away a large amount of money which I should have to account for in the shape of repairs."

Facts such as these can be attested by many master car-builders. When the annual inventory is taken, showing the cost of repairs, and which forms an essential part of the general statement of the condition of the road, the directors and managers are surprised at the enormous outlay, and naturally conclude that their master car-builder, although an experienced and competent man, must be looked after. They do not seem to realize that if cars are contracted for, and bought without consulting him, his experience is of no use to them, and consequently he is not to blame for the money thus thrown away. If our railroad presidents and superintendents will give a little more of their attention to this matter, they will save much unnecessary outlay, besides securing better cars, and will receive the thanks of at least one

MASTER CAR-BUILDER.

Axles and Journals.

EDITOR OF THE NATIONAL CAR-BUILDER:

DEAR SIR: I notice in your July number an article taken from the *American Railway Times* on the Form of Axles, which is very correct with one exception, and that is the statement that the wheel-fit should be one half inch larger than the journal. Now, if this is correct, the writer would use either an unusually large journal or a very small axle; and as this is a very important part in the construction of a car, I should like to draw out some ideas from our car-builders in reference to the best size and length of journals. My own opinion is, that on most roads they continue to use journals that are too short, mainly because they have so many old axles on hand and do not wish to add another length and also another width of truck. But the question is, Would it not be better to make the change if it would obviate the too common trouble of hot journals, caused, in my judgment, in a great measure by the concentration of the friction to a smaller point? Increase the length but not the diameter of the journal, and you do not increase the friction; but as soon as you increase the diameter, you *do* add to the friction. Now, if this theory is correct—and I believe it is—I am surprised that so many new roads will begin the construction of their rolling stock, and accumulate a large number of cars, before they secure the services of a person competent to plan and build and take care of them—a man who has made the business his special study. If such a man was employed and permitted to use his judgment without undue interference, much subsequent outlay would be saved for repairs. The wear and tear would be proportionately less. I am aware that the oil has much to do with the running; but if all the facts in connection therewith were duly considered—the wear both of brasses and journals, the annoyances of delays and lost connections in consequence of hot journals—it seems to me that some change would be made, or that a fair trial at least would be given to a longer journal and better oil.

I trust we may be favored, through the medium of your paper, with the views of others upon this subject.

AXLE.

NEW-YORK, June 16, 1870.

MESSRS. VOSE, DINSMORE & CO.:

DEAR SIRS: Please find resolutions of thanks adopted by the master car-builders, in convention, June 8th and 9th, 1870:

"*Resolved*, That we feel grateful to all who have been the means of affording us so much happiness, and we tender our thanks particularly to Messrs. Vose, Dinsmore & Co., for their invitation to a carriage ride through Central Park, and the sumptuous collation served at Manhattanville."

Assuring you, gentlemen, that your courtesies will ever be pleasantly remembered, I remain, yours very respectfully,

L. GAREY,
Secretary M. C. B. A.

NEW-YORK, June 17, 1870.

TO L. G. TILLOTSON, ESQ., *Chairman of Committee:*

DEAR SIR: Allow me to forward you resolutions as adopted by the Master Car-Builders' Association, in convention, June 8th and 9th, 1870:

"*Resolved*, That while we appreciate the many favors extended during the session to the members of this convention by their New-York friends, we tender our thanks particularly to the merchants of New-York through L. G. Tillotson, Esq., chairman of their committee, for the sumptuous banquet prepared for us, and their successful efforts to make it enjoyable to all."

Hoping that we may have the pleasure to reciprocate in some manner, I remain, yours very respectfully,

L. GAREY,
Secretary M. C. B. A.

Mechanical and Scientific.

Virtue of Borax.

IT may not be generally known how very valuable borax is in various purposes of household use. We find it the very best cockroach exterminator yet discovered; one half pound has completely cleared a large house, which was formerly swarmed with them, so that the appearance of one in a month is quite a novelty. There is something peculiar in either the smell or touch of borax which is certain death to cockroaches. They will flee in terror from it, and never appear again where it has once been placed. It is also a great advantage that borax is perfectly harmless to human beings; hence, no danger from poisoning. For cleansing the hair, nothing is better than a solution of borax in water. It leaves the scalp in a most cleanly condition, and the hair is just sufficiently stiffened to retain its place. This stiffness, however, can be readily removed, if objectionable, by washing with water. Borax is also an excellent dentrifice. Dissolved in water, it is one of the best of tooth-washes. In hot countries it is used in combination with tartaric acid and bicarbonate of soda as a cooling beverage.

Uses of Mica.

RECENTLY scales of mica have been used for spectacles and in optical instruments. The chief use in this country is in connection with stoves, and it is now quite an article of commerce, especially in New-England. Many furnace-doors are now supplied with small holes closed with mica, which serve as windows to enable the engineer to see the state of the fire without letting in a blast of cold air by opening the door. Many varieties of mica abound in curious markings, which have attracted the attention of microscopists as affording some clue to the true origin of this stone. Mica is one of the constituents of granite, and contains potash, and sometimes lithia and other alkalies. Stove dealers are the chief consumers of this article.

Lamp-Black.

LAMP-BLACK is superior to ivory-black for striping purposes, as it covers better and runs smoother, and when used over a groundwork of white, straw color, yellow, and similar light colors, it appears black enough by contrast. When mixed in oil and exposed to the weather, without being varnished, its power of resistance is surprising, and this is probably due to a certain oily nature which it has, and which causes it to take so much longer to dry than ivory-black. Drop-black does not possess this inherent greasy nature to assist it in resisting atmospheric influences, and if unprotected by varnish will perish sooner than lamp-black.

Fine Varnish for Wood.

THE varnish applied to Connecticut clock-cases, wooden picture-frames, and other cheap objects, is made by mixing two pounds of copal varnish with half an ounce of linseed-oil varnish, and the mixture is shaken often to mix it well. The wood is prepared with a thin coat of glue-water, rubbed down with fine pumice-stone. In light-colored wood, a light pigment, such as chalk, is added to the glue-water; in dark wood, an equally dark pigment is added. After drying, the articles are rubbed with a solution of wax in ether, thereby acquiring a high polish.

Facetiæ.

A WISCONSIN gentleman sat down on a beehive the other day. He regrets the thinness of his trowsers.

SOME one says if the night air is as unhealthy as the doctors say it is, how do they account for the longevity of owls?

A BACHELOR, according to the latest definition, is a man who has lost the opportunity of making a woman miserable.

A VISITOR at Cape May recently missed his pillow in the morning, and after searching awhile found it laid up over his ear, like a bit of lead-pencil.

A HOUSE that has just been built in New-York, with all the modern improvements, has a billiard-table in the basement, a bowling-alley in the cellar, and a croquet-ground beautifully fitted up in the attic.

AN erring Indiana hen was recently found in the back part of a hardware store, where the misguided fowl had struggled for three weeks trying to hatch out half a dozen white porcelain door-knobs. She was very much reduced.

AN exchange says a fifty pound shoat gained access to a cellar, and helped himself to a jar of peach-brandy that had been set aside for more delicate use. The proprietor, happening to discover the intruder, found him stretched out, dead drunk, unable to move or even wink. The hog finally recovered from the effects, and has not been near the place since.

AN urchin of six or seven years went into a barber-shop and ordered the barber to cut his hair as close as shears could do it. He was asked if his mother ordered it that way. "No," said he, "but school commences next week, and we've got a schoolma'am that pulls hair, and I'm bound to fix her this time, you bet."

THE patents, contracts, cars, and equipments heretofore belonging to the Central and Southern Transportation Companies have been transferred to the Pullman Palace Company, and by this arrangement the latter company acquire the right to run cars over 6000 miles of additional railway, as well as the entire ownership of all sleeping-car patents, the right of which has heretofore been in litigation between the Central and Pullman Companies.

Postal-Cars.

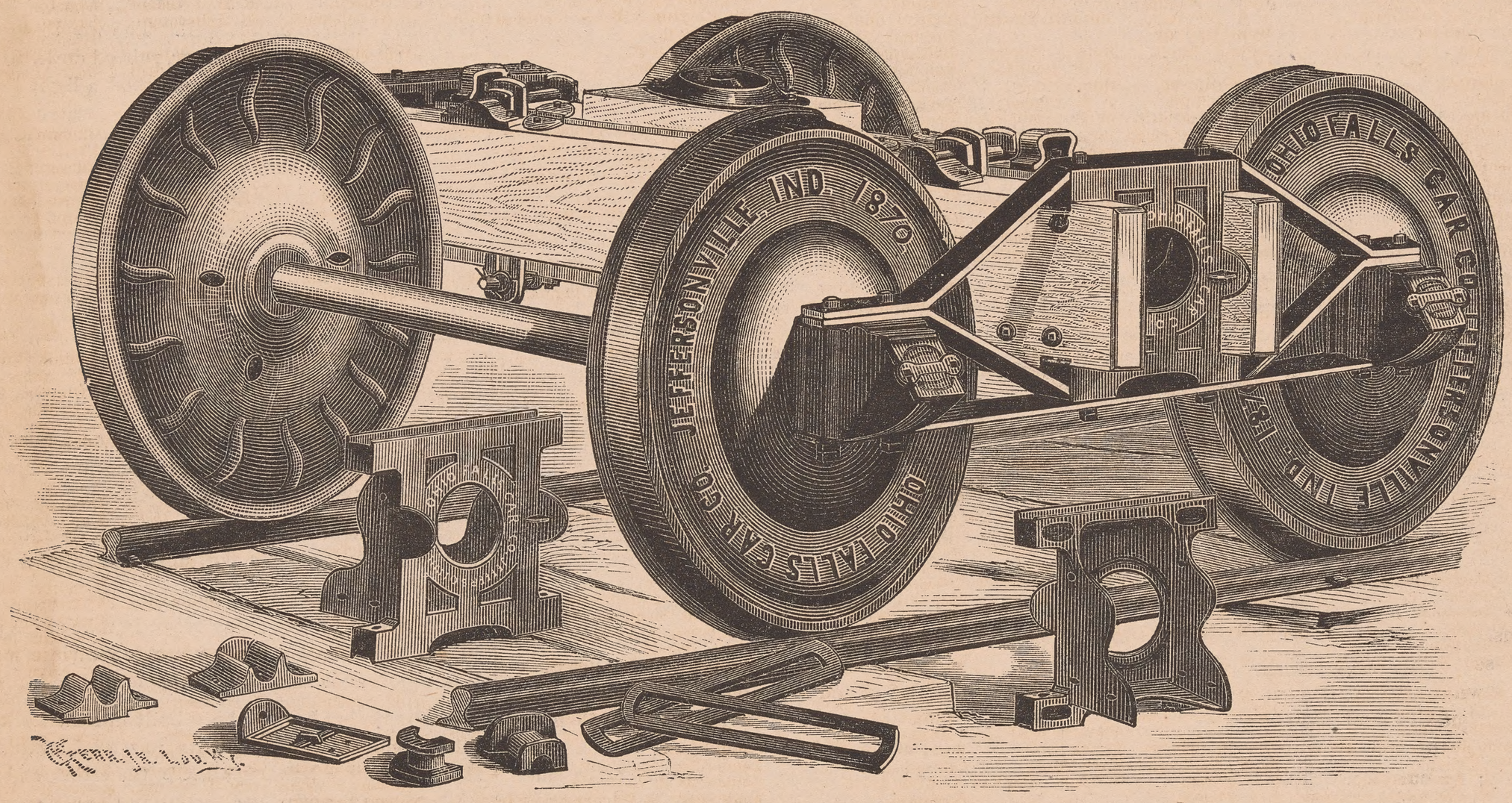
THE postal-car system has grown to be a matter of great public importance, and all improvements tending to facilitate the delivery of mails through this manner of distribution are of general interest. The new postal-car, No. 32, which has just been completed and placed on the New-York and Washington route, is one of the finest specimens of car architecture, intended for postal service, ever placed on any line. It was built by the Philadelphia, Wilmington, and Baltimore Company, at their car-shop in Wilmington. Great attention has been paid to economy of space, so that there is ample room for the storage of through mails, and every accommodation necessary for distribution along the route. Under the excellent management of H. F. Kenney, General Superintendent of the Philadelphia, Wilmington, and Baltimore Railway, postal clerks have received many courtesies which have not unfrequently tended to facilitate the business of the Post-Office Department.—*Official News.*

A TRAIN composed of all the locomotive and railway carriages in Europe would reach from St. Petersburg to Paris, and would contain 400,000 passenger carriages and 500,000 luggage vans. The railways of Europe are carried over 62,000 large and small bridges, and go through 34 miles of tunnel; 150,000,000 cwt. of iron has been used for the rails, and 80,000,000 cwt. of coals is required yearly to feed the engines. The network of European railways represents a length of 70,718 miles; 18,000 locomotives are employed on it; and the distance these travel during the year is 60,000,000 miles.

INSTEAD of the established method for testing steel rails by dropping a ton weight upon them from a height of eighteen feet, a seventy-five pound weight, dropping four feet, is to be used by the Philadelphia and Baltimore Railway Company. It is considered that to subject the rail to some thousands of blows from this comparatively light hammer is a nearer approach to the treatment which it receives in actual service.

AN English paper says that a new method of warming first-class carriages in express trains has been adopted in Bavaria. A special van is attached to the train and contains a powerful "calorifere," and the heated air is conveyed to all the carriages of the train by means of India-rubber tubes. The experiment with first-class carriages is reported upon so favorably that the authorities have determined to apply it to all the carriages on the Bavarian lines, and it is expected that it will soon be adopted on all the German railways.

WILLIAM SIMPSON, of Easton, Pa., may reasonably claim to be one of the oldest railroad men in America. The first rails ever laid on wooden sleepers were laid by him on the Camden and Amboy Railroad in 1832. Up to that time, rails had been laid on stone blocks, and it was thought necessary to make the track perfectly solid and inelastic. Mr. Simpson helped to land a locomotive at Newcastle, Del., in the spring of 1832, when there were only three in this country.



IMPROVED LATERAL MOTION IRON FREIGHT-CAR TRUCK.

THE engraving we herewith insert represents an iron truck with swing-beam, designed and introduced by the Ohio Falls Car Company, Jeffersonville, Ind., and which is now being used by them, as we believe, with much success. We are aware, however, that there are objections to it; but it is not our present purpose to discuss them. Our paper being a medium for every kind of information pertaining to car construction, we insert the accompanying cut with the design of drawing from practical car-builders any comments they may feel disposed to make, as well as any suggestions that may lead to the adoption of any other kind they may consider better. In the mean time we shall be glad to receive designs or cuts of other kinds of trucks for insertion in our columns.

Items.

JACKSON & SHARP, of Wilmington, Del., employ 300 men in their car-shops.

A COURT in Indiana has decided that a man who accepts a "pass" to travel free on a railroad can not recover damages of the company if he encounters an accident.

THE Hannibal and St. Joseph Railroad Company are turning out at their shops in Hannibal nine freight-cars per week, and two passenger-coaches per month. The company have ordered three hundred additional freight-cars and five new locomotives. Seven freight trains leave daily for the West.

A LADY traveler, who finds the accommodations of sleeping-cars not entirely favorable to persons of delicacy, writes as follows: "It may be Christian and civilized and all that for people to lodge together, but I think it is not convenient; and I think one gorgeous car expanded into two plain ones, for the separate accommodation of the sexes at night, would be a public blessing. Men will stalk up and down the cars in a negligent habit, but women will not. They join the curtains together, undo a hook and eye, unfasten a lace, take out a hair-pin, and, after they are in bed, draw off their gaiters. Further they dare not venture; for if stone walls have ears, tapestry has eyes."

THE Wason Manufacturing Company, of Springfield, Mass., have just turned out nine first-class passenger-cars for the South Side Railway of Long Island. Each car seats sixty passengers. An order has been given by James Fisk, Jr., to them for two baggage-trucks, to be used in Gotham at the depot of his New-York and Boston express, and the vehicles are nearly presentable, being done elegantly in blue and gold. The same company have contracted to build 300 box freight-cars for the Rutland and Burlington Railroad.

THE Underground Railroad in London is set down as a success. The cost of construction, including the purchase of property, amounted to $2,500,000 per mile. First and second-class cars are run every four minutes. The locomotives consume their own smoke, and it is estimated that 200,000 people pass daily through the line.

AT the Adrian shops, under the direction of the master mechanic, J. K. Taylor, a new locomotive (No. 106) has just been completed. It is considered an unusually complete and well-finished machine, and on its trial trip was found ready to begin regular service. It is called the "Charles F. Hatch," in honor of the general superintendent of the road. It is designed for a passenger-engine, weighs about thirty-two tons, has driving-wheels five and one-half feet in diameter, and a sixteen by twenty-four inch cylinder. The diameter of the boiler is forty-eight inches, and it has one hundred and fifty copper flues, eleven feet three inches long. The fire-box has a sixty-inch grate. The boiler is built of the Hussey & Wells homogeneous steel.

THE Wason Car Manufacturing Company is building for the New-Haven, Hartford, and Springfield Railroad four twelve-wheeled passenger-cars, with iron trucks, which are said to cost $3500 for each car. There will be seats for seventy-six passengers in each car.

THE New-York Central Railroad has, among its other appointments for public convenience, a special car designed for the transportation of valuable horses. Its interior is divided into two box-stalls, fixed up with all the appointments necessary to complete equine luxury.

IN PROSPECTIVE.—It is contemplated to establish a railroad car-factory on an extensive scale at Parkersburg, West-Virginia.

DIRECTORY
OF
MASTER MECHANICS AND MASTER CAR-BUILDERS
THROUGHOUT THE UNITED STATES.

A

Railroad.	*Master Mechanic.*	*Master Car-Builder.*	*Residence.*
Albany & Susquehanna	R. C. Blackall	R. C. Blackall	Albany, N. Y.
Atlantic & Great Western		N. H. Marsh	Kent, Ohio.
Atlantic & Gulf	C. Collins	J. Sullivan	Savannah, Ga.
Alexandria & Fredericksburg			Alexandria, Va.
Alabama & Chattanooga	H. M. Smith	H. M. Smith	Chattanooga, Tenn.
Atlantic & North-Carolina	E. J. Clayton	E. J. Clayton	New-Berne, N. C.
Atlanta & West-Point	Wm. Rushton		Atlanta, Ga.
Atlanta & West-Point	R. D. Cole		Newnan, Ga.
Atlantic & Pacific			Boston, Mass.
Allegheny Valley	G. W. Glass	R. Gunning	Pittsburg, Pa.
Androscoggin	Ira K. Russell	C. S. Greenwood	Farmington, Maine.
Adirondack			Saratoga, N. Y.
Alexandria, Loudon & Hampshire	Nathaniel Hayes	Nathaniel Hayes	Alexandria, Va.

B

Bay de Noquet & Marquette	John J. Murphy	H. D. Lyons	Marquette, Mich.
Bangor, Old Town & Milford	J. B. Peckham	John H. Brown	Bangor, Maine.
Bennington & Rutland	John Haining		Rutland, Vt.
Baltimore & Ohio	John C. Davis	John C. Davis	Baltimore, Md.
Bellefonte & Snow Shoe	H. D. Landis	H. D. Landis	Bellefonte, Pa.
Belvidere Delaware	R. McDowell	John Stiver	Lambertville, N. J.
Boston & Albany	Wilson Eddy	F. D. Adams	Springfield, Mass.
Boston & Albany	A. B. Underhill	W. E. Chamberlain	Boston, Mass.
Boston & Providence	George S. Griggs	John Lightner	Roxbury, Mass.
Boston, Clinton & Fitchburg	John Webster	Samuel Stevens	Fitchburg, Mass.
Boston, Concord & Montreal	R. Adams	M. R. Elkins	Lake Village, N. H.
Boston & Maine	N. G. Paul		Boston, Mass.
Boston & Maine		D. C. Richardson	Lawrence, Mass.
Boston & Lowell & W. L.	L. R. Winslow	S. A. Davis	Boston, Mass.
Blossburg & Corning	O. C. Patchell	O. C. Patchell	Corning, N. Y.
Brockville & Ottawa	Joseph Cockfield	Joseph Cockfield	Brockville, Can.
Blue Ridge			Anderson, S. C.
Burlington & Missouri River	G. Chalender	G. Chalender	Burlington, Iowa.
Burlington, Cedar Rapids & Minn			Cedar Rapids, Iowa.
Buffalo & Erie (see Lake Shore)	William Hart	J. N. Mileham	Buffalo, N. Y.
Buffalo & Washington			Buffalo, N. Y.
Boston, Hartford & Erie	D. Thomas	Elias Pratt	Boston, Mass.
Buffalo, Corry & Pittsburg	Thomas Connell	Thomas Connell	Corry, Pa.
Buff. Bayou, Brazos, Colorado	E. Perry	M. Borst	Harrisburg, Tex.

C

Camden & Amboy	F. B. Stevens		Hoboken.
	T. T. Kerr	E. Lockwood	Bordentown, N. J.
	Thomas Single		South-Amboy.
Camden & Atlantic	E. Collings	S. Wills	Camden, N. J.
Catawissa	A. J. Prescott	G. P. Trustermacher	Catawissa, Pa.
Cape Cod	E. A. Walker	William Cannon	Hyannis, Mass.
Calais & Baring	Chas. W. Butler	Chas. W. Butler	Milltown, Me.
Cascade	E. Copley	James Smith	Cascades, W. T.
Catasauqua & Fogelsville	Thomas Evans	Chas. S. Holbach	Catasauqua, Pa.
Carrolton & Oneida	M. T. Wiggins		Carrolton, Ohio.
Charleston & Savannah	H. T. Calder		Charleston, S. C.
Chesapeake & Ohio	W. G. Freeman	J. N. King	Richmond, Va.
Cheraw & Darlington			Cheraw, S. C.
Champlain Trans. Co	H. T. Calder		Burlington, Vt.
Cheshire	F. A. Perry	F. A. Perry	Keene, N. H.
Charlotte & South-Carolina	T. D. Kline	W. T. Brown	Columbia, S. C.
Chicago & North-western	*Horatio Anderson		Chicago, Ill.
Chicago & North-western		Thomas Hull	Chicago, Ill.
Wiscon. Mad. & Mill. Divis	Geo. W. Tilton	Henry Hull	Fond du Lac, Mr.
Galena Division	R. W. Bushnell	Hugh Gray	Chicago, Ill.
Chicago & N. W. Iowa Division	C. C. Elliott	William Campbell	Clinton, Iowa.
Chicago & N. W. Peninsula Division	S. L Pierce		Escanaba.
Chicago & Alton	John A. Jackman	R. Reniff	Bloomington, Ill.
Chicago, Burlington & Quincy	C. F. Jauriet	W. W. Wilcox	Aurora, Ill.
Chicago, Cincinnati & Louisville	C F. Kidder	D. B Howe	La Porte, Ind.
Chicago, Rock Island & Pacific	T. B. Twombly	J. I. Fogg	Chicago, Ill.
Cleveland, Col., Cin., & Indianapolis	W. F. Smith	William Cleve	Cleveland, Ohio.
Cleveland and Pittsburg	N. E. Chapman	E. S. Taylor	Cleveland, Ohio.
Cleveland, Zanesville & Cincinnati	J. W. Holloway	J. W. Holloway	Akron, Ohio.
Cincinnati, Hamilton & Dayton	William Cullen	W. H. Allison	Cincinnati, Ohio.
Cincinnati & Zanesville	Peter Green	D. J. Jewell	Lancaster, Ohio.
Cincinnati & Indianapolis Junction	O. H. P. Little	W. W. Degnacey	Cambridge, Ind.
Cincinnati, Sandusky & Cleveland	Wm. Swanston	William Earick	Sandusky, Ohio.
Concord	E. Studley	M. W. Dickerman	Concord, N. H.
Concord & Claremont	J. N. Lander	A. Langmaid	Concord, N H.
Council Bluffs & St. Joseph	Myron Ellis		Council Bluffs, Iowa.
Connecticut River	John Mulligan	J. Hitchcock	Springfield, Mass.
Contoocook River			Concord, N. H.
Conn. & Passumpsic Rivers	Horace Alden	Horace Alden	Lyndon, Vt.
Cumberland Valley	A. S. Hull	C. W. Nitterhouse	Chambersburg, Pa.
Cumberland & Pennsylvania	W. L. Jordan	N. Binnix	Mt. Savage, Md.
Central of Georgia	B. L. Boulineau	C. C. Millar	Savannah, Ga
Central of New-Jersey	†T. S. Peeples	George Hackett	Elizabethport, N. J.
Central Branch Union Pacific	W. A. Grubb	W. A. Grubb	Atchison, Kansas.
Central R. R. of Iowa	H. P. Vedder	H. P. Vedder	Elden, Iowa.
Central Pacific	E. T. Perkins	E. T. Perkins	Sacramento, Cal.

D

Dayton & Union	A. J. Keenan	J. F. Feicht	Dayton, Ohio.
Danbury & Norwalk	Charles A. Craig	Wm. W. Bedient	Danbury, Ct.
Dayton & Michigan	William Cullen,	W. H. Allison	Cincinnatti, Ohio.
Delaware, Lackawanna & Western	William Dawson	A. Overbagh	Scranton, Pa
Des Moines Valley	Morris Sellers	R. E. Smith	Keokuk, Iowa.
Detroit & Milwaukee	B. Briscoe	B. Briscoe	Detroit, Mich.
Delaware & Hudson Canal Co.	James Dickson	Thomas Orchard	Carbondale, Pa.
Dorchester & Delaware			Cambridge, Md.
Dubuque South-western	J. M. Williamson	J. M. Williamson	Farley, Iowa.
Dutchess & Columbia			Washington, N. Y.

E

Eastern		J. P. Somerby	Salem, Mass.
Eastern	John Thompson		East-Boston, Mass.
East-Tennessee & Virginia	Charles A. Hodge	W. F. Leavy	Knoxville, Tenn.
East-Tennessee & Georgia	Eli Hixon		Knoxville, Tenn.
East-Pennsylvania	J. M. Geary	Samuel Reeves	Reading, Pa.
Erie Railway	*E. O. Hill		Susquehanna, N. Y.
Erie Railway	H. L. Brown	C. A. Smith	Jersey City, N. J.
Erie Railway	M. E. Brown	M. Wilder	Buffalo, N. Y.
Erie Railway	W. E. Cooper	W. E. Cooper	Dunkirk, N. Y.
Erie Railway		W. E. Rutter	Elmira, N. Y.
Evansville & Crawfordsville	John L. White	A. Sharra (fore'n)	Evansville, Ind.

* General Master Mechanic. † Mechanical Engineer.

Railroad.	*Master Mechanic.*	*Master Car-Builder.*	*Residence.*
Evansville, Henderson & Nashville	W. H. McCafferty	W. H. McCafferty	Nashville, Tenn.
European & North Am. (of Maine)	A. O. Bailey	J. H. Brown	Oldtown, Maine.
Erie & Pittsburg	John Young	John Young	Erie, Pa.
Eldora			Dubuque, Iowa.

F

Florida	J. G. Chalk	G. Hernandez	Tallahassee, Fla
Flint & Pere Marquette	Sanford Keeler	Sanford Keeler	East-Saginaw, Mich.
Fitchburg	Geo. A. Cooledge	Enos Varney	Charlestown, Mass.
Fitchburg & Worcester			Fitchburg, Mass.

G C

Grand Trunk	*Richard Eaton		Montreal, Canada.
Galveston, Houston & Henderson	William McBeth	E. J. Sherman	Galveston, Texas.
Grand River Valley		James Potts	Jackson, Michigan.
Grand Rapids & Indiana			Fort Wayne, Ind.
Great Western of Canada	*Wm. A. Robinson		Hamilton, Canada.
Georgia	William Hardman	James Frost	Union Point, Ga.
Greenville & Columbia		J. O. Meredith	Helena, S. C.

H

Hanover Branch	John J. Bingley	Henry Butcher	Hanover, Pa.
Hartford & New-Haven	N. Slingstand	F. Leppense	Hartford, Ct.
Hannibal & St. Joseph	H. A. Towne	H. C. Whiting	Hannibal, Mo.
Hartford, Providence & Fishkill	Edwin Garfield	V. D. Perry	Hartford, Ct.
Hackensack & New-York	Abra'm Angausen		Hackensack, N. J.
Hastings & Dakota	C. C. Clements		Hastings, Minn.
Housatonic	C. R. Morris	J Ferris	Bridgeport, Ct.
Houston & Texas Central	Reuben B. Snyder	J. F. Rice	Houston, Texas.
Houston Tap & Brazoria	A. Malsch	R. H. Yeomans	Houston, Texas.
Huntington & Broad-Top Mountain	D. G. Gilchrist	M. Tellerhoof	Saxton, Pa.
Hempfield			Washington, Pa.
Hudson River	Wm. Buchanan	Wm. S. Town	New-York.
Hudson River	John Dykeman	Charles D. Mills	East-Albany, N. Y.

I

Indianapolis, Cincinnati & Lafayette	H. M. Britton	H. M. Britton	Cincinnati, Ohio·
Indianapolis, Peru & Chicago	John McKenna	John McKenna	Peru, Ind.
Illinois Central	S. Hayes	C. Scoville	Chicago, Ill,
Iowa & Missouri State Line			Farmington, Iowa.
Iron	Perry Scott	Clem. Roetling	Ironton, Ohio.
Indianapolis & St Louis	C. E. Benton	C. E. Benton	Litchfield, Ill.

J

Jeffersonville, Madison & Indiana	Reuben Wells	John Higgins	Jeffersonville, Ind.
Jackson, Lansing & Saginaw	Andrew Wilson	A. Wilson	Jackson, Michigan.

K

Keokuk & St. Paul	P. R. Sutton	Wm. McElroy	Keokuk, Iowa.
Knox & Lincoln			Bath, Maine.
Kentucky Central	J. R. Ledyard	J. L. Hackenthorn	Covington, Ky.
Knoxville & Charleston			Knoxville, Tenn.
Kansas Pacific	Geo. W. Cushing	J. Townsend	Wyandotte, Kansas.
Kalamazoo, Allagan & Grand Rapids			Kalamazoo, Mich.

L

Lake Erie & Louisville	John Pero		Fremont, Ohio.
Lackawanna & Bloomsburg	Chas. Graham		Kingston, Pa.
Lehigh Valley	J. Kinsey		South-Easton, Pa.
Lehigh Valley	P. Hofecker	E. R. Brown	Weatherly, Pa.
Lehigh Valley	A. Mitchell	Mauch Chunk, Pa.	Delano, Pa.
Lehigh Valley	D. Clark		Hazelton, Pa.
Lehigh & Susquehanna	L. C. Brastow	L. C. Brastow	Wilkesbarre, Pa.
Lehigh & Susquehanna	Wm. H. Brown		Mauch Chunk, Pa.
Leavenworth, Lawrence & Gal	S. Philbrick		Lawrence, Kansas.
Lewy's Island	C. W. Button	Damase Merceir	Milltown, Maine.
Little Rock & Fort Smith			Little Rock, Ark.
Lebanon Springs			Burlington, Vt.
Little Miami, Col. & Xenia	J. H. Setchel	M. P. Ford	Cincinnati, Ohio.
London & Port Stanley			London, C. W.
Louisville, New-Albany & Chicago	Jacob Losey	Jacob Losey	New-Albany, Ind.
Long Island	Chs. A. Thompson	E. A. Olmstead	Hunter's Point, L.I.
Louisville, Cincinnati & Lexington	John Skidmore	Theo. G. Shaw	Louisville, Ky.
Louisville & Nashville	Thatcher Perkins	Isaac M. Owens	Louisville, Ky.
Lake Shore & Michigan Southern	†James Sedgley		Adrian, Mich.
Michigan Southern Division	James K. Taylor	John Kirby	Adrian, Mich.
Michigan Southern Division	B. H. Kidder.		La Porte, Ind.
Lake Shore Division	‡A. Congdon	A. Congdon	Cleveland, Ohio.

M

Macon & Augusta			Macon, Ga.
Maine Central	J. W. Philbrick		Waterville, Me.
Macon & Western	Wm. McCandless	James A. Knight	Macon, Ga.
Manchester & Lawrence	Edward Studley	M. W. Dickerman	Concord, N. H.
Macon & Brunswick	M. Thornton	M. Thornton	Macon, Ga.
Maysville & Lexington			Maysville, Ky.
Marietta & Cincinnati	E. Bosley	E. Bosley	Chillicothe, Ohio.
Memphis, Clarksville & Louisville			Clarksville, Tenn.
Memphis & Little Rock	D. R. Wing		Little Rock, Ark.
Memphis & Charleston	Michael Burk	A. W. Drew	Memphis, Tenn.
Memphis & Charleston	L. M. Sellars	Thomas Varun	Huntsville, Ala.
Mineral Point	Robert Hay		Mineral Point, Wis.
Mississippi & Tennessee	Henry Teague		Memphis, Tenn.
Mississippi Central	Henry Gibbon	John E. Becton	Water Valley, Miss.
Maryland & Delaware	Samuel Peters		Greensboro, Md.
Mississippi, Gains. & Tus			Gainsville, Ala.
Missouri Valley	W. D. Rowley		St. Joseph, Mo.
Midland Pacific			Nebraska City, Neb.
Milwaukee & St. Paul	§E. W. Hall	Wm. E. Kettridge	Milwaukee, Wis.
Milwaukee & St. Paul.		John Baillie	Milwaukee, Wis.
Minnesota, Iowa & Dakota Division	James Waters	D. F. Wilson	
Michigan Central	A. S. Sweet, Jr	J. B. Sutherland	Detroit, Mich.
Montgomery & West-Point	J. McVey	W. H. Daniels	Montgomery, Ala.
Montgomery & Eufaula	I. G. Holmes	I. E. Holmes	Montgomery, Ala.
Mobile & Montgomery	James McFarland	L. Barham	Montgomery, Ala.
Mobile & Girard	James McCam	A. J. Nix	Girard, Ala.
Mobile & Ohio	G. D. Linning	John McHugh	Mobile, Ala.
Missouri River, Fort Scott & Gulf	H. A. Towne		Kansas City, Mo.

N

Nashville & Chattanooga	John U. Eastman	J. G. Sawyer	Nashville, Tenn.
Nashville & Decatur	C. B. Knowles	C. B. Knowles	Nashville, Tenn.
New-Bedford & Taunton	Robert Chase	Robert Chase	New-Bedford, Mass.
New-Canaan			New-Canaan, Ct.
New-Brunswick & Canada	T. Armstrong	T. Armstrong	Saint Andrew's, N.B.
New Haven & Northampton	Henry Fox	Henry Fox	Westfield, Mass.
New-York & Oswego Midland	William Griggs		Oneida, N. Y.
New-York & Harlem	Wm. M. Strong	Leander Garey	New-York.
New-York Central	* C. T. Ham.	Joseph Jones	Albany, N. Y.
New-York Central	G. B. Van Vorst		Albany, N. Y.
New-York Central	Henry Watkeys		Syracuse, N. Y.

* Mechanical Superintendent.
† General Master Mechanic. ‡ General Master Mechanic and Master Car-Builder.
§ Superintendent of Motive Power and Machinery.

Railroad.	*Master Mechanic.*	*Master Car-Builder.*	*Residence.*
New-York Central	Edward L. Tyler		Rochester, N. Y.
New-York Central		Wm. Johnson	Buffalo.
New-York & Flushing			Flushing, L. I.
New-York, Providence & Boston	Jas. H. Anderson	Jas. H. Anderson	Providence, R. I.
New-York & New-Haven	H. Kittendorf	M. C. Andrews	New-Haven, Ct.
New-London Northern	J. W. Dow	George Boyden	New-London, Ct.
New-Jersey & Transportation Co	John Headden	David H. Baker	Jersey City, N. J.
New-Haven & Derby			New-Haven, Ct.
New-Orleans, Opelousas & Gt. Western	John McCluskey	Matthew Nolan	Algiers, La.
New-Lisbon			Leetonia, Ohio.
New-Orleans & Ohio	John R. Jordan	John R. Jordan	Paducah, Ky.
New-Orleans, Jackson & Gt. Northern	John Conlon	Charles Bartine	New-Orleans, La.
New-Haven, Hartford & Springfield			Hartford, Ct.
Naugatuck	R. Post	George W. Gray	Bridgeport, Ct.
Newark & Bloomfield	Luke F. Tronson		Hoboken, N. J.
Nova Scotia	W. Johnson		Bedford, N. S.
North-Missouri	Edmund Taylor	B. H. Buck	St. Louis, Mo.
North-Carolina	E. Burns	B. G. Sergeant	Co. Shops, N. C.
New-Orleans, Mobile & Chattanooga	George Shattuck	George Shattuck	
Northern Central	C. M. Lewis		Baltimore, Md.
Northern Central		G. W. Demarest	York, Pa.
North-Lebanon	Henry B. Oves	Henry Arnold	Lebanon, Pa.
North-Pennsylvania	Franklin Roop	Franklin Roop	Philadelphia, Pa.
North-Eastern	D. W. Haines	A. M. Corrie	Florence, S. C.
Northern	James W. Lander	Albert Langmaid	Concord, N. H.
Northern of New-Jersey	T. W. Demarest		New-York.
Norwich & Worcester	Richard Colburn	G. R. Bentley	Norwich, Ct.
Northern of Canada	James W. Forster		Toronto, Can.
Norfolk & Petersburg	J. S. Whitworth	J. G. Bottiger	Norfolk, Va.

O

Ogdensburg & Lake Champlain	William A. Short		Ogdensburg, N. Y.
Oswego & Syracuse	Josiah Bettis	J. H. Parker	Oswego, N. Y.
Ohio & Mississippi	George W. Harris	M. M. Martin	Cochran Shops, Ind.
Old Colony & Newport	C. F. Bullock	A. Gleason	Boston, Mass.
Orange, Alexandria & Manassas	James E. Waddy	John T. Nalls	Alexandria, Va.
Oil City & Pithole	George Thompson		Pithole, Pa.
Oil Creek & Alleghany River	J. S. McElroy	Jacob Williams	Corry, Pa.
Oil Creek & Alleghany		H.J.Bookhammer.	Oil City, Pa.

P

Panama	Thomas Cobb	J. G. Wilson	Aspinwall, N. G.
Pacific of Missouri	B. Warren	B. Warren.	St Louis, Mo.
Paterson & Newark			Paterson, N. J.
Pennsylvania	* Isaac Dripps		Altoona, Pa.
Pennsylvania	H. D. Garrett	I. W. Van Houten.	W. Philadelphia, Pa.
Pennsylvania	M. A. Shattuck	Samuel W. Myers.	Harrisburg, Pa.
Pennsylvania	T. W. Worsdell	John P. Levan	Altoona, Pa.
Pennsylvania	D. O. Shaver	R. S. Ramsey	Pittsburg, Pa.
Philadelphia & Erie	George J. Mason.	T. J. Hamer	Sunbury, Pa.
	Robt. M. Messimer.	W. L. Foster	Renovo, Pa.
	Wm. P. Newcomb.	W. L. Holman	Kane, Pa.
	John Quigley	W. T. Smith.	Erie, Pa.
Philadelphia, Wilmington & Baltimore	George W. Perry.	George W. Perry.	Wilmington, Del.
Philadelphia & Reading	John Wootten	Aaron Steinbach.	Reading, Pa.
Philadelphia, Germ'n & Norris'n	John Moyer	Nathan Pawling.	Philadelphia, Pa.
Philadelphia & Baltimore Central	Peter Fagan	SamuelD. Danfield.	Chester, Pa.
Pittsburg, Cincinnati & St. Louis	Luther R. Wallace.	H. L. Clark	Logansport, Ind.
	William Romans.		Columbus, Ohio.
	Thomas Denmead		Dennison, Ohio.
	Thomas V. Losee.	John Gottschall	Indianapolis, Ind.
		James McGee	Steubenville, Ohio.
Pittsburg, Fort Wayne & Chicago	S. M. Cummings.	John Marquis	Alleghany, Pa.
Pittsburg, Fort Wayne & Chicago	J. M. Boon.	Wm. Waddington.	Fort Wayne, Ind.
Pittsburg & Connellsville	D. P. Rennie	J. M. Rutter	Connellsville, Pa.
Peoria, Pekin & Jacksonville	Henry A. Little	Henry A. Little	Pekin, Ill.
Peninsular			Battle Creek, Mich.
Portland & Rochester	Jas. S. Drake.	Samuel Dean	Portland, Me.
Portland & Kennebec	John Ellis	J. W. Trussel.	Augusta, Me.
Portland & Oxford Central	Geo. W. Battles.	Geo. W. Battles.	Buckfield, Me.
Portland, Saco & Portsmouth	John Donnell		Portland, Me.
Port Royal			Beaufort, S. C.
Port Hope, Lindsay & Beaverton	H. G. Taylor	H. G. Taylor	Port Hope, Can.
Port Huron & Lake Michigan			Port Huron, Mich.
Providence, Warren & Bristol	Rufus Smith	J. Brightman	Bristol, R. I.
Portsmouth, Gt. Falls & Monmouth	James Tucker	E. Fall	Union Village, N.H.
Petersburg	R. B. Adams	Alex. Wright	Petersburg, Va.
Providence & Worcester	Joseph Kelly	Olney L. Smith	Providence, R. I.

R

Raritan & Delaware Bay	Rufus Blodgett.	Rufus Blodgett.	Manchester, N. J.
Raleigh & Gaston.	I. B. Gayle	I. B. Gayle	Raleigh, N. C.
Rensselaer & Saratoga	W. B. Gage		Troy, N. Y.
Richmond, Fredericksburg & Potomac	H. Kuhn	W. H. Trainham.	Richmond, Va.
Richmond & Danville	John McFarland.	B. P. Owen	Richmond, Va.
Richmond & Petersburg	Wm. Piermont.	William N. Bragg.	Richmond, Va.
Richmond & York River			Richmond, Va.
Rome, Watertown & Ogdensburg	Wm. Jackson	Wm. Jackson	Rome, N. Y.
Reading & Columbia	B. Van Lew		Columbia, Pa.
Rome, Georgia	O. W. Harbin	O. W. Harbin	Rome, Ga.
Rochester & Genesee Valley	M. Wilder	M. E. Brown.	Buffalo, N. Y.
Rockford, Rock Island & St. Louis	J. Hutchinson	J. Hutchinson	Rock Island, Ill.
Rock Island & Peoria			Rock Island, Ill.
Rutland	N. L. Davis	M. M. Crooker	Rutland, Vt.

S

St. Croix & Lake Superior			New-York City.
St. Lawrence & Ottawa	Calvin Dame	Calvin Dame.	Prescott, Canada.
St. Joseph & Council Bluffs	H. S. Cooper.	H. S. Cooper.	St. Joseph, Mo.
St. Paul & Pacific	C. N. Parker, Jr.	C. B. Boynton.	St. Paul, Minn.
St. Louis & Iron Mountain	E. B. Gibbs.	Oscar Doolittle	Carondelet, Mo.
Sandusky, Mans. & Newark	John Y. Beattie	Charles Scoeby.	Sandusky, Ohio.
St. Joseph Valley			Kalamazoo, Mich.
San Antonio & Mexican Gulf	W. T. Bingham		Victoria, Texas.
South Side of Long Island			New-York.
St. Paul & Sioux City	Jas. G. Butterfield		Shakopee, Minn.
St. Louis, Vandalia & Terre Haute			St. Louis, Mo.
South-Carolina	W. B. Smith	John Reed	Charleston, S. C.
South-Side of Virginia	I. T. Robinett	I. T. Robinett.	Petersburg, Va.
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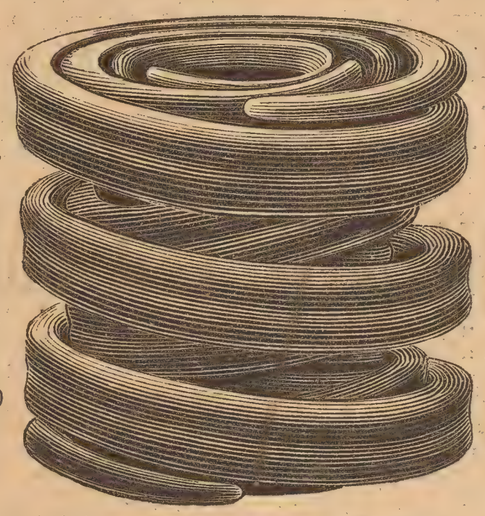

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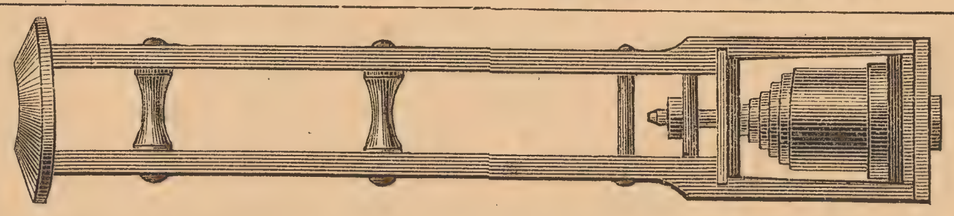

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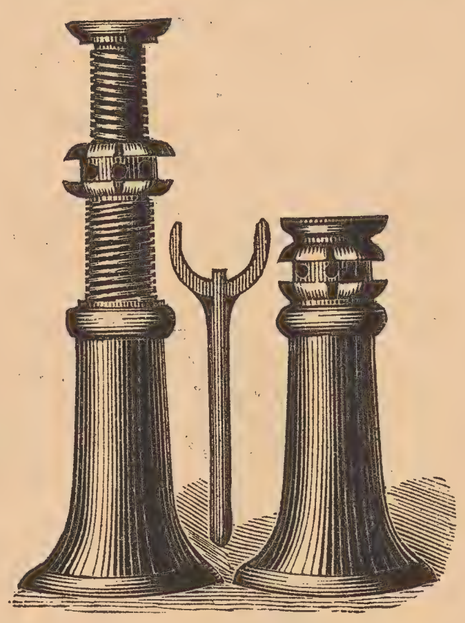

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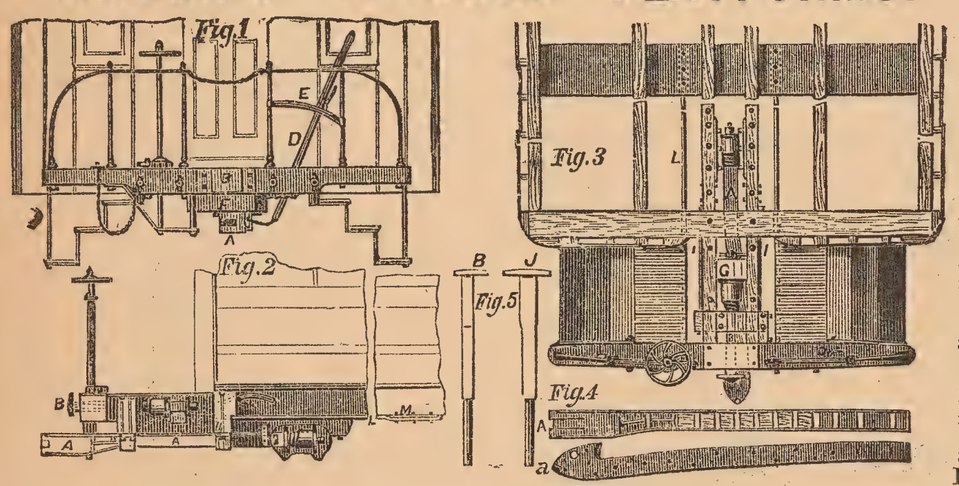

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DESCRIPTION.

Figure 1 is an elevation; Figure 2, a longitudinal section; Figure 3, a plan of an end of a car to which the arrangement has been applied; and Figures 4 and 5 show top and side views of the "Hook" and "Buffer," drawn on a larger scale than that of Figures 1, 2, and 3.

The letters refer to the same parts in all the figures. A is the coupling "Hook," B the "Buffer," C the "Stop," D the "Lever," E the "Quadrant Ratchet," F the "Truss Beam," G the "Spring Beam," H the "Suspender Beam," I the "Upward Trusses," K the "Main Spring," L the "Downward Trusses," and M the "Bolster."

The Platforms, instead of being located below the centre line of the main sills of the cars, are placed *in* that line, and held there by the Trusses I and L, so that the point of contact (in Buffers B) is *in* the said centre line and *not below* it.

The coupling "Hook" A is attached to the draw spring the same as the ordinary draw head, and at the same height above the track, but in such a manner that the outer end is free to move laterally for a short distance. The Coupling Hook projects beyond the platform. The Stop C is placed under the Buffer Beam to prevent accidental uncoupling. When two cars are brought together, the Coupling Hooks, from *their shape*, push each other aside, until the Buffers B are compressed hard on the Buffer Springs, then—*the points of the hooks having passed each other sufficiently far*—the Hooks are carried forward by their main-springs, and thus the "*Coupling*" and "*Compression*" are both effected

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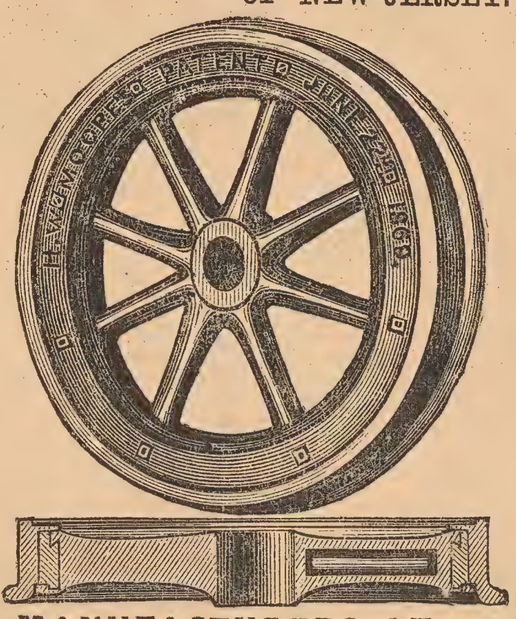

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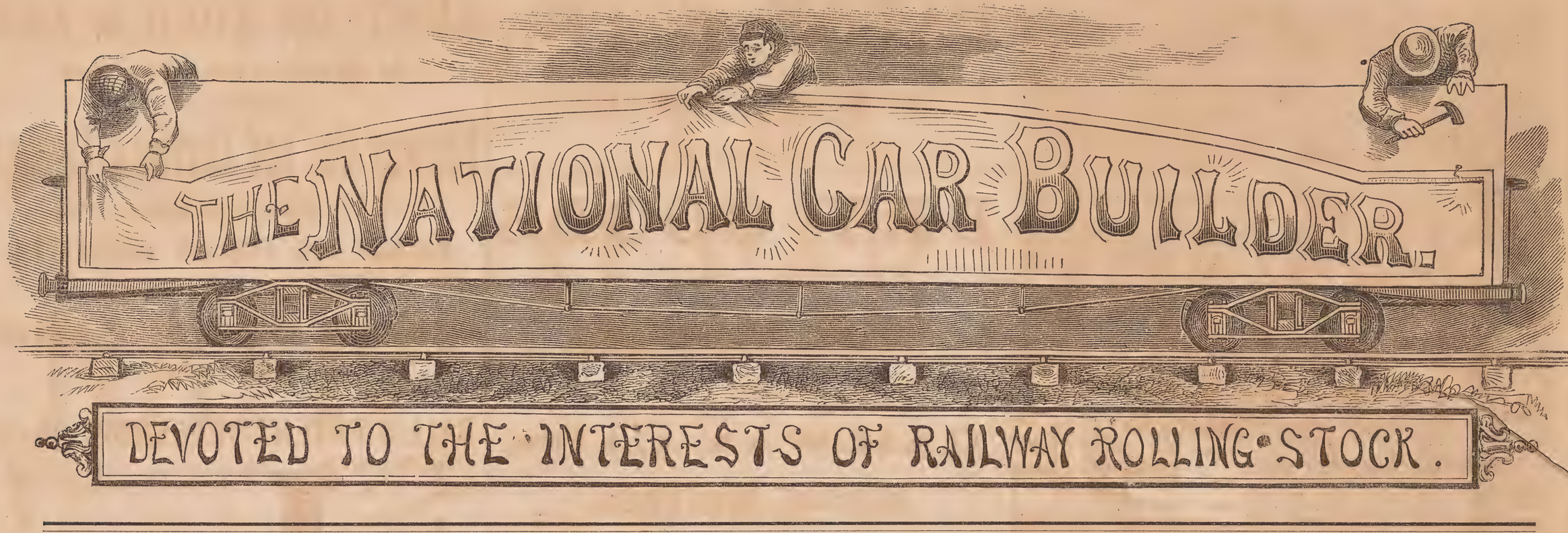

DEVOTED TO THE INTERESTS OF RAILWAY ROLLING STOCK.

Vol. I.
No. 3.

SEPTEMBER, 1870.

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Editorial Announcements.

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The name and address of the writer must accompany all communications designed for publication.

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Ourselves.

WE desire to return our thanks to numerous friends who have forwarded their names and remittances for THE NATIONAL CAR-BUILDER. More especially would we acknowledge the many club-lists of subscribers which have been sent us, a method which enables us to send their papers in a single package to one address. We forbear mentioning particular names or localities, as that would be invidious. Suffice to say, our subscription-list is growing at a very satisfactory rate, considering the short time since it was started. We trust our friends will continue steadfast in well-doing. Our subscription price is so very low, we hope all those who have already received the initial numbers will authorize us to consider them subscribers for the year.

Master Mechanics' Association.

THIS Association will hold its third annual meeting in Philadelphia, on Wednesday, 14th instant. This organization representing, as it does, interests so nearly identical with those of the Master Car-Builders' Association, it would seem probable that at no distant day the two organizations will be merged into one. It would seem to us that such a consummation would equally promote the interests of all concerned in railway rolling stock, including as it does locomotive as well as car construction.

Ornamentation.

WE are all gifted in a greater or less degree with an innate perception which enables us to discriminate in material things between what is beautiful and what is ugly—between what is pleasing, graceful, and harmonious in the combinations and diversities of form and color, and what is discordant, uncouth, and offensive. As this perception is not a mere simple sensation, like sight, smell, or taste, and as there is a very great difference in the degree in which it exists in different minds, it follows that there is no final and universally recognized test which can be applied in every case to determine what is absolutely and intrinsically beautiful. A great deal depends on association and suggestiveness, which are the result of individual training, culture, and observation. Without going into any labored analysis of beauty in the abstract, we repeat that the perception of it exists in all minds more or less, and we naturally seek to gratify it. We superadd to things of mere utility something to please the eye. We are not content with a house, or a fence, or a carriage, or coat, for the bare use they subserve, but must have embellishment along with them; and not unfrequently we "lay it on rather thick," and without much regard to the fitness of things. There seems to be at present a proneness on the part of our artisans to indulge in mere finery, resulting from a superficial study, or perhaps no study at all, of the laws of artistic proportion, harmony, and adaptation. They follow too much their own crude impulses and wayward fancies, and produce work which is either positively bad or indifferently good, pleasing and satisfying nobody. Ornamentation upon buildings or other suitable subjects is a source of genuine pleasure to every one, if used with taste and discretion; but if used capriciously, subject to no restraint, and in disregard of the limitations and requirements of true art, it is little better than a curse. Its fantastic freaks and whimsical absurdities attract for the moment the vulgar gaze; but being destitute of any real life, meaning, or true decorative power, it soon comes to be regarded with indifference and aversion. In the profusion of embellishment everywhere to be seen, there is a great deal of toy-work—the novelties and vagaries of the fancy—proceeding from no higher source than a desire for mere display; but underlying all this is an instinctive craving for what is true. We have made commendable progress in the discovery and application of laws and principles, but have not yet reached the goal.

It is not our purpose, even if our space would permit, to dwell upon the numerous and manifest crudities in artistic decoration generally. There is one consideration, however, the importance of which is not sufficiently appreciated, we think, by car-builders and other artisans, which is this: Do not expend money and toil in beautifying with fine and elaborate ornament things belonging to active and occupied life, where it can only be seen by restless crowds with minds absorbed in business, and necessarily deprived of the temper and discretion suited to the contemplation of it. It is false economy to adorn under such conditions; the cost of it is not only so much thrown away, but art itself is degraded by being forced into such unseemly fellowship. We can not mix ornament with business without somewhat of detriment to both. It is only in intervals of leisure, when the mind is free from interruption, that the handiwork of the artist can be properly estimated and enjoyed. Believing this theory to be a correct one, we think it should not be lost sight of in the external finish and decoration of passenger-cars. They are built for swift movement. The idea of speed is inseparably associated with them. They are very little at rest. We never look at them as we do at the stained windows, and carved and frescoed ornaments of a church during a drowsy sermon. We are either going somewhere or coming home, weary, soiled, vexed, hungry, and crazed with the din of innumerable noises. What care we under such circumstances for varnish, gilding, and paint? Nothing, save to get away from the sight of it, and the turmoil connected with it. Then why should so much time and labor be expended in the outside painting of cars, giving them a finish like a piece of rosewood furniture to be put in a show-room or sent to the fair? Paint is necessary to protect the wood from the weather, but the colors need not be as flaming and gorgeous as those of an autumn sunset. We saw some new cars the other day painted fiery red, and we have seen others in all the primitive hues of the rainbow; but these specimens of car-painting are exceptional, we are happy to say. The same principle should be applied in the decoration of station-houses, which are at most times the very abodes of discomfort. They should be well built and commodious. Any thing more than this is useless superfluity.

With respect to the inside finish of passenger-cars, a judicious use of ornamentation is not out of place. The occupants of them are less hurried, their minds comparatively tranquil, and in a condition to observe and scrutinize things about them. The ornamental details of the vehicle will, therefore, not escape attention. In the style of the surface work there is considerable latitude for variety; but whatever style is adopted, let there be no painted imitation, no cheap trickery. Avoid all false expedients—all deceits. The deception is easily detected, and its purpose revealed. All such deception is mean, and smacks of the meagreness of poverty. Ornament of any kind is not an essential thing, and if fallacious, is hardly worth the having. Nothing is more beautiful and appropriate than the natural grain of wood—walnut, maple, chestnut, oak, and other varieties—and we are glad to see this style of finishing is being generally adopted for ordinary passenger-cars, taking the place of sundry cheap and objectionable devices in the way of graining, marbling, and gilding. The introduction of mirrors is of questionable propriety, and if used at all in car decoration, should be used sparingly. Canvas roof-linings are a deception so far as they appear to be other than they are; but they save expense, and if skillfully painted,

present a pleasing surface to the eye. A few landscape paintings, properly disposed in side-panels, are a delightful source of pleasure; but let them have some real artistic merit. Beware of daubs and mere machine-work from which even the uneducated eye turns with instinctive aversion. Better not invest money at all than to invest it in cheap pictures. Nothing is more worthless.

In the fitting up of the more luxurious drawing-room car, the same general principles apply in the matter of decoration. Choice woods, carving, plate-glass, and mirrors can be used with excellent effect; but the most attractive feature of this class of cars is the upholstery, which should be selected with the same taste and discrimination as if designed for a well-furnished house. There should be no auction shabbiness about it, nor should it be so "stunning" in its richness as to give the car the appearance of a doll-baby house or furniture show-room. It requires but a moderate degree of discernment to perceive the difference between unostentatious elegance and flash vulgarity. We do not need mere splendor for the sake of splendor, but only so far as it harmonizes with the natural instincts of true refinement.

In this brief article it has not been our purpose to dwell upon details and particulars, but merely to indicate some general principles which we think are not sufficiently borne in mind by our builders and artisans. All decoration is to some extent a matter of individual taste; but if this taste is exercised capriciously, and in disregard of guiding fundamental truths, the work produced will be devoid of real merit, or else so misplaced by unhappy juxtaposition that the time and labor expended upon it are practically thrown away.

Historical Sketch of Railway Cars.

THE history of car-building, although to a great extent unwritten, is nevertheless one of absorbing interest to the builder and owner; and it has often been a source of regret as well as of wonder to the writer that so little has been written upon this subject. The student in this branch of history, as well as the builder, will search in vain for any concise or correct and well-written history of this invaluable and indispensable adjunct of railroad traffic. It is, therefore, proposed to give, in a series of articles, a very brief history of the railroad car, from its first introduction to the present time.

The first description of a railway car which the writer has been able to find is that given by Mr. John Francis, in his *History of the English Railway*, in which, speaking of the first tram-roads built in England, he says, "The manner of carriage is by laying rails of timber from the colliery down to the river, exactly straight and parallel; and bulky carts are made with four rowlets, fitting those rails." The date at which this first tram-road was constructed is not given; but it must have been later than the year 1670, as that was the time when English coal first began to be extensively used for fuel. The "bulky carts" spoken of were little more than boxes, mounted upon rollers, they being made to contain one ton of coal each. Cars of the form above described continued to be used for several years at the Newcastle mines, during which time other companies adopted them; and they appear to have been used until the year 1738, when cast-iron rails were introduced, and much larger cars were used. But these were found to be too cumbersome, and were abandoned for smaller ones, which were so arranged as to be coupled together. This first step in the improvement of railroad cars was taken in 1768, at which time it is probable that cars were first coupled together so as to form a train.

Shortly after the date last given, brakes were first applied to the wheels of cars, at which time one pair of iron wheels was used upon each car, while the other pair was made of wood; the theory held being that the brake-block, or shoe of the brake, would not act upon the surfaces of cast iron wheels. But this fallacy was soon dispelled, and the lever of the brake was lengthened for the purpose of enabling the attendant to press it more firmly upon the wheels, and the brake was applied to the iron wheels, and soon after to all four of the wheels. At about this time the wooden wheels were abandoned, and the cars were mounted upon iron wheels only. This last-named improvement was effected about the years 1770 to 1773.

Up to this time the wheels appear to have been made to fit to some extent the rails upon which they were to run; they being generally supplied with two flanges, the spaces between which were sometimes made flat to run upon a rail, the upper surface of which was of a similar construction; while others were made to fit a rail having a rounded upper surface, and yet others were so constructed as to fit various other forms of rails.

Cars having wheels with a single flange were placed upon the Penrhyn Railway, in July of 1801. It was soon found, however, that these wheels wore away rapidly, and that great friction was caused in consequence of such wear, and the double-flanged wheel was restored to favor, but in an improved form.

Between the years 1801 and 1821 there does not appear to have been any very striking change in the character of railroad cars, except that they were steadily improving in their details, springs being introduced to carry the body of the car, and thus relieving them of much of the wear to which they had previously been subjected. In the year last named there appears to have been introduced an entirely novel feature in the construction of cars as well as of the tracks or ways upon which they were to run.

A single rail constituted the track, and the car or cars were made double, or in pairs; one being suspended upon each side of the elevated rail, by which means two wheels were made to serve the purpose of eight. The wheels were placed one before the other, upon axles of sufficient length to form supports which extended far enough beyond the wheels to receive and carry the car or receptacle for freight; the centre of gravity being always below the surface of the rail, small wheels or rollers being placed upon vertical shafts to bear upon the sides of the track to prevent the car from tilting sideways.

The most important change made in cars was that of M. Thomas Parkin, of France, which was shortly after the last-named date, it consisting of a car having recesses, or grooves, formed in its lower edges, and furnished with iron plates to run upon stationary but rotating wheels, placed at proper intervals, which constituted the track. These cars were propelled or drawn by wind-mills, stationed at proper intervals along the line; ropes or chains being used to connect the cars to the mills. The bodies of these cars were much longer than were those which had preceded them, they being in many respects like those now in use for the transportation of freight.

In 1802, a car, or a combined engine and car, was introduced, which must have been one of the first, if not in reality the first car used exclusively for the transportation of passengers. This car was provided with an engine and all the appurtenances necessary to make it self-propelling, so that it is difficult to determine whether it should be classed as a car or as a locomotive engine, provided with seats for the convenience of passengers. However this may be, it was one of the pioneers in its line, and its originator is entitled to great credit for his skill in constructing and arranging its parts.

In 1816, car-wheels made their appearance, which were made by using cast-iron hubs and rims or treads, the spokes being of malleable iron. This wheel appears to have been a very decided improvement upon any that had preceded it, inasmuch as it was lighter than those with cast spokes, and much more durable than the wooden ones which had so long been used. From what has been said, it will be seen that the cast-iron wheel which is now so extensively used in this country had its origin in England in the early days of railroads in that country, and although our car-builders and car-users still adhere to them with great tenacity, the people of England have, to a great extent, abandoned their use, believing that the wrought-iron tired wheel is, upon the whole, more economical.

In 1826, cars were introduced upon an English railway having an axle for each wheel, each axle extending entirely across the frame of the car, there being two at each end, one of which was placed just far enough in advance of the other to permit the wheel upon the rear one to rotate without coming in contact with the front one. The object of this arrangement was declared to be to "prevent the wrenching of the axles in turning short curves."

Previous to the last-named date, or in 1824, a decided novelty in the form of a railway car made its appearance upon an English road, it having been invented by Mr. William Francis Snowdon, and placed upon the road on the 18th of December of that year. This car was two stories in height, and was circular in form. Upon the lower floor the horses which propelled it were placed; the space within the circle thus occupied being devoted to freight, while the upper story was devoted entirely to passengers, stairways being provided for their ascent to, and descent from, their elevated position. This car ran upon rails provided with cogs upon their inner surfaces, into which pinions placed upon vertical shafts meshed, said shafts being propelled by the large tread-wheel upon which the horses were placed.

This brings us to the end of our first article. In our next we shall continue the subject, and endeavor to give brief sketches of cars which were constructed between the years 1826 and 1850.

Hot Boxes.

CAN not some live Yankee supply a cure for "hot boxes" on railway trains? With the constant improvements in railway machinery, this would seem to be a simple invention, and yet it hasn't arrived. The question was suggested by a detention to your correspondent the past week, by which your readers lost their no doubt valued (if not valuable) correspondence. The Pacific Express, the lightning train from Chicago, made its usual excellent time as far as Harrisburg, and should make no stop from that city to Philadelphia, a run of 105 miles. In half an hour the train was stopped with two journals smoking in a forward car. Buckets of water and greasy waste cured this, and the run, after the loss of fifteen minutes, was continued below Lancaster. Shortly again the train halts, and this time a lively tongue of flame is issuing from a journal on a rear car. Three successive stops were made on account of this trouble before reaching Philadelphia, and the loss of time in the aggregate very considerable. Now, we respectfully submit that, as somewhat greater problems in machinery have been solved, the remedy for this nuisance lies within the possibility of human genius. To the man who *does it* we promise a customer *certain* in one of the leading railways, if we can judge any thing from the remarks of a prominent railway official on that "hot box" train.

We copy the above paragraph for the purpose of announcing that the remedy called for has been discovered in "Devlan's Patent Journal-Box Lubricator;" and, in our opinion, nothing need be done to abate the nuisance complained of but to give this remedy a fair trial. It consists of a pad or saddle corresponding to the length of the journal, made of wool and hair, combined expressly for the purpose, and filled with elastic sponge. Before putting this pad in the boxes, it is saturated with oil in the same manner as waste; the sponge holding the oil in a state of absorption, and supplying it to the journal as fast as required. The sponge never loses its elasticity, is not liable to decay or harden, and always keeps up to its place. The pad or cushion will run six months without re-filing, if the boxes are in good order; and one man can pack one hundred cars with them in less time than he can pack ten with waste. This lubricator has been but recently

introduced. We have seen certificates of its satisfactory working upon several roads, including the Erie Railway and Pennsylvania Central, indorsing it in the most unqualified manner, and conceding all its inventors claim in its behalf as a lubricator superior to any other on the score of effectiveness and cheapness.

Wrought-Iron Car-Truck.

Mr. James Kirkley, foreman of the blacksmith-shops, and Mr. Hugh Grey, superintendent of car-works of the Chicago and North-Western Railway, have devised and secured a patent for a car-truck constructed entirely of wrought-iron, with the exception of some minor parts not subjected to severe concussion. The first model of this truck was completed a little more than two years ago, since which time it has been tested on a number of roads with very satisfactory results. The Chicago *Railroad Gazette* in a notice of it says: "The first introduction of this truck, some two years since, has led to several changes in the older forms of wooden trucks, both by suggesting improvements and by the adoption directly of some of its peculiarities. We are inclined to think that all the considerations which in bridge construction argue so convincingly in favor of the exclusive use of iron apply with equal force to the construction of car-trucks. The same ends, durability and economy in weight and space, are to be secured. The iron trucks of the pattern thus far manufactured at the North-Western's car-shops have been carefully compared with the improved wooden ones manufactured for the same service. Two pairs of six-wheeled trucks, one wooden and the other iron, were built a year ago last spring, when it was found that the cost of the iron trucks was not more than three per cent in excess of the wooden ones, and undoubtedly the cost of the iron trucks will be materially lessened when the different parts are manufactured by the quantity. Objection has been made to the new trucks on the score of their additional weight; but the objectors were astonished to find, on comparing several pairs of wooden and iron trucks now in use under Pullman cars, that the iron trucks actually weighed from five to seven hundred pounds less per truck than the wooden ones. Another important consideration is, that the strength and endurance of the iron truck can be greatly increased, and even doubled where extraordinarily severe service is anticipated, while, where wood is the material used, no such increase of strength can be attained without a materially disproportional increase in cost and bulk."

Grammar.

The *Scientific American* says the bugbear of grammar is preventing many valuable ideas and suggestions from receiving the publicity they deserve, and that it is not necessary to possess the most happy style of expression to communicate important facts. An old professor used to remark that most people of moderate education can write and speak forcibly if they *have something to say*, meaning that they must possess some complete idea, well thought out, before they attempt to utter it. A man having an idea thus mentally wrought out, may misplace capitals and misspell words, but he can scarcely fail to to make himself understood; for his thinking has been done in language, and the natural expression of the idea must be nearly or quite as clear as his thinking. But if he try to assume an artificial style quite foreign to that which he is accustomed to use, ten to one he will fail to make himself understood.

We trust no correspondent or reader will hesitate to communicate any thing he deems of value to us for fear of making grammatical or orthographical errors. Let the aim be merely to express the ideas clearly, and we will be responsible for all the rest.

A locomotive at an average speed of thirty miles an hour would reach the moon in eleven months, and the sun in three hundred and fifty-two years. Light travels from the sun to the earth in eight minutes.

We beg to direct attention to the advertisement on our cover, by which it will be seen that Vose, Dinsmore & Co. have been appointed sole representatives in America of the celebrated steel manufacturers, Hte. Petin Gaudet & Cie., Rive de Gier, France The works of this company are probably the most extensive of the kind in the world, comprising several establishments, each having its specialty, producing every variety of steel in use, and manufactured by the most improved processes known to them in the course of their long and successful experience. Their representatives in this country will be supplied with whatever the American market requires of the various products of their manufacture—of which we would mention the Bessemer steel rail, spring steel, axles, cast-steel tires; also steel for tools, dies, cutlery, and files, gun-barrel and merchant steel. Mr. Henry Champin, who has heretofore represented Messrs. Petin Gaudet & Co. in this country, will be associated with Vose, Dinsmore & Co, in the steel department of their business, as general manager.

In our last number we inserted a cut of an improved lateral-motion, iron freight-car truck, designed and introduced by the Ohio Falls Car Company of Jeffersonville, Ind. In the brief paragraph which accompanied it, we stated that there were objections to it, although it had been used with much success. We suppose no iron or wooden truck has ever been made, or is likely to be made, that will not be liable to some objection, well founded or otherwise. As regards this particular one, we have reason for believing that its practical working is very satisfactory on Western roads, where it has been extensively introduced by the above named company. The objections to which we referred proceed, we think, from localities where steep grades and short curves make it necessary for brakes to be attached to the truck instead of the body of the car.

California Palace-Car.

There has been considerable discussion of late in reference to the withdrawal of the Pullman palace-cars from the Central Pacific road, and the question has arisen, "How shall this road be supplied?" San Francisco has undertaken to answer this question, and in a large wooden building that has been raised in the square area of the Kimball Manufacturing Company is constructing the first palace-car of Pacific build.

The dimensions of this car are the same as the largest Pullman, that is, fifty-five feet in length, ten in breadth, and thirteen and one half feet high. It is what is denominated a drawing-room car, being divided into compartments, or rooms of different sizes, with passage-ways through in a zigzag form, so as not to interfere with the arrangement of the rooms. Each room will be arranged to communicate with the passage, but at pleasure can be shut up and made private; and each is provided with all toilet conveniences, so that a compartment can be chartered through, and, in case of sickness, etc., all the privacy and comfort of a private suite of apartments at a hotel can be enjoyed. In other particulars, such as arrangement of berths, etc., they will be similar to the improved Pullman, all the patent parts of which, such as prop-joints, seat-hinges, etc., will be purchased in Chicago.

This being the first palace-car built in California, some pains will be taken to have it constructed as nearly as possible of California and Oregon woods; and with this view, the makers are collecting samples of all the choicest woods for interior finish, and have already over thirty varieties, consisting of laurel, manzanita, madrona, black-oak, white-oak. buckeye, etc.; in addition to which, they have received from the lower coast several specimens of beautiful woods never before used or seen here. One variety in particular being most beautifully variegated, and emitting a perfume as delicate as the violet wood. This wood, which is very rare and expensive, has been recently introduced here in a small way, and used in the manufacture of glove-boxes, card-cases, etc., and the sawdust as "sachet powder." It is death on fleas and moths. A few parcels of this wood will be used in the panels to make up the variety.

It is not proposed to expend money on this car for ornament, other than in woods; metallic ornaments will be mostly omitted, and the builders rely upon fine workmanship, handsome woods, and their skill and taste, for the production of a rich and elegant car, combining the luxury and comfort of a Pullman at about one half the cost.—*Hub.*

The Miller Platform.

The accident at Wayne station, eighteen miles west of Detroit, last week, was due entirely to the neglect of a switchman, who turned the switch to let the freight train upon the side-track, and neglected to turn it back again. The Atlantic express, a long and heavy passenger train, was approaching at a rapid rate, probably thirty miles an hour, as it does not stop at that station, and was within a few hundred feet when the engineer discovered the position of the switch, and cut off steam. Thus the freight train was struck with a terrible momentum. Two cars of the freight train were crushed and then the locomotive left the track and was turned over.

The remarkable feature of the case was the slight damage to the passenger cars. The locomotive and tender and baggage-car were badly shattered, but almost the only injury to the passenger-cars was the battering of the front end of the forward car. No passenger was injured. Doubtless this fortunate result was due to the construction of the cars, in themselves very strong and solid, and provided with the Miller platform, which renders the whole train almost as stiff as a single car. With ordinary cars, it is altogether probable that one or two cars at least would have "telescoped," and a great destruction of life ensued.

Refrigerator Car.

The following is a description of a refrigerator car which is to be built at Sacramento, for the transportation of fruit from California to New-York:

"It is constructed with double sides, ends, top, and bottom with sawdust filled in between the inner and outer boards. The doors are double, and made air-tight when closed by means of rubber packing. Ten boxes, suspended by iron bands about eighteen inches from the ceiling of the car, are designed to serve as receptacles for ice. These boxes will of course be filled prior to the loading of the car, and in case more ice is needed while the car is in transit, it can be put in without difficulty through small trap-doors in the roof, made to fit perfectly air-tight. The original plan of the designer of the refrigerator presupposed the car to be nearly two feet higher than the ordinary freight-cars, and contemplated placing a flooring directly beneath the ice-boxes the entire length of the car, with small apertures for the cold air to pass down from the boxes to the main portion of the car. As the introduction of such a floor would leave an inconveniently small space in the present instance for the stowing of freight, it was omitted, which certainly appears to be the better manner of construction."

This will be used in carrying fruit to Chicago this season; and if it proves a success, a number of the same pattern will be built next year, and run for the same purpose.

The new car-works of the Flint & Pere Marquette Railway Company, now in course of construction at Saginaw, are, according to the Saginaw *Enterprise*, to be 80 × 202 feet on the ground, 80 feet square of which will be two stories high, 28 feet walls, with medallion corners and slate roof, supported by truss-work. Eighty feet by 122 will be one story high, the wall and roof being 20 feet high, supported by columns.

The Taunton Car Manufacturing Company have lately sent off several handsome passenger-cars for the New-York, Flushing, and North Side Railroad, Long Island, and two others will be turned out soon.

Miscellaneous Items.

H. E. SARGENT, the Superintendent of the Michigan Central R. R., says that in the collision which recently occurred on that road much damage was prevented in consequence of the cars being supplied with the Miller platforms.

THE St. Louis *Times* gives an account of an excursion, under the auspices of the Indianapolis and St. Louis R. R., to exhibit one of Sanderson's new sleeping-coaches—which is described as light and airy, and all jarring is prevented by the system of running-gear, constructed specially for this line.

THE Erie Railway Adjustable Freight-Car has made the round trip from New-York to San Francisco and return—running time, fourteen and a half days. The patent—W. B. Snow's—is a stout steel "feather" inserted in a lateral groove in the axle, in which notches are cut. In breaking gauge, the car is run off upon a side-track which adjusts the wheels to the gauge required, where they are held by the notches. The wheel is a broad flanged wheel, and will run from the broad gauge upon the compromise gauge, 4 feet 9½ inches, without adjusting the wheels.

THE pay-roll of the Ranlet Car Manufacturing Company at Laconia, N. H., is $250 a day for help, or $1500 a week. The company recently sent an elegant passenger-car for the European and North-American Railroad, and have one for the Boston, Concord, and Montreal road, of a new and elegant pattern, finished in green and gold and mahogany.

THE new shops of the Pennsylvania R. R., now in course of construction at Altoona, Pa., cover an area of twenty acres, and comprise an iron machine-shop, a planing-mill, a blacksmith-shop, a cabinet workshop, and a three-quarter round brick building, for the repair of freight-cars.

THE Pacific Express on the Pennsylvania Central Railroad made the run between Altoona and Harrisburg, one hundred and thirty-two miles, in three hours' time, equal to one mile in one minute and twenty seconds the entire distance. On the Tuesday following, the same train made the same run in two hours and fifty-eight minutes, and the entire distance from Altoona to Philadelphia, two hundred and thirty-eight miles, in five hours and eighteen minutes.

AN effort is being made to secure the construction of car-works and rolling-mills at Jackson, Mich. Already $100,000 have been subscribed. The total amount required will be $200,000, which is fast being raised.

A POINT of some interest has arisen in connection with the use of steel rails on the Great Central Belgian Railway. It is found that steel rails which have been laid resist wear and tear extremely well, but that they acquire such a polish that the action of brakes and the adhesion of engines upon them are seriously interfered with. Experiments upon the subject are being made with a view to the collection of further facts.

CAN not something be done to remove the dust and cinders which are now such a serious annoyance to all railway travelers? This has been a live subject for many years, and millions of money have been expended in experiments, but still the trouble exists. Indeed, the finer the car, the more dust there often is, because before the best and fastest trains there are less baggage-cars. There is less annoyance from this source in Europe, from the fact that in that country there are often ten, fifteen, and even twenty baggage-cars intervening between the engine and passenger coaches.

A COMPANY has been organized in New-Orleans for the application of condensed air as a motive-power for street railways. The cylinders are to be of paper, and placed on top of the cars. A trial has been made with this method, and a car with twenty-eight passengers was driven three miles and a half in seven and a quarter minutes.

AT Leroy, Minn., one hot day this summer, a switch had been opened for the purpose of letting in a freight train, and when it became necessary to change the switch back to the main track, the rails had expanded so much by the action of the sun's rays that it could not be done. Cold water was poured upon several sections of the track, cooling off the iron and allowing the switch to be shut.

A PLAN for uniform railroad gauge is under consideration by railroad men and members of Congress. Five sixths of the roads already have the same gauge—4 feet 8½ inches. The expense of exchanging will not exceed $500 a mile.

JACOB UNGETER, an engineer of the Louisville, Cincinnati, and Lexington "Short Line" Railroad, reports that engine No. 24 on this road from the 1st of July, 1869, to the 30th of June, 1870, a Rogers engine, 16x24 inch cylinder, 5-foot 6-inch wheel, ran during the year 44,800 miles; her lowest mileage in a month was in February, when she ran 3300 miles; her highest mileage for one month was in July, 1869, when she ran 4380 miles. She has not lost a trip during the whole year. The average mileage per month is 3733⅓ miles.

CHARLES WILSON, of the Brotherhood of Locomotive Engineers, writes as follows of a locomotive recently built by Wilson Eddy, Master Mechanic of the Boston and Albany Railroad: "Mr. Eddy has recently turned out a new engine from his shop that possesses some new peculiarities. The truck and tender wheels have steel tires, welded to a cast-iron spider by a new process invented by Mr. Nathan Washburn, of Worcester, Mass. If Mr. Washburn succeeds in making his new wheels hard enough to stand the wear on the flanges, he will have the best wheel that has ever been made. The wheels are all turned up in a lathe, and it makes a much more perfect job than the old way."

A NEW method of warming first-class carriages in express trains has been adopted in Bavaria. A special van is attached to the train, and contains a powerful "calorifere," and the heated air is conveyed to all the carriages of the train by means of India-rubber tubes. The experiment with first-class carriages is reported upon so favorably that the authorities have determined to apply it to all the Bavarian lines, and it is expected that it will soon be adopted on all the German railways.

WITH one or two exceptions, the Vulcan Works, at Chattanooga, are the largest in the South. They run ten puddling-furnaces, two train of rolls, a steam hammer and machine-shop, blacksmith-shop, etc., employing 150 men, and turning out large quantities of bar iron, car-axles, and forgings generally. They are making quantities of fish-bars for the railroads near Chattanooga. The capacity of the mill is about 20 tons per day. Major S. B. Lowe is the builder and manager of the works.

MR. U. B. VIDAL, of Philadelphia, proposes to provide the street-cars with strong skirts or nets, supported on frames to extend from the flooring down to or near the ground. The object of the improvement is to save persons who fall from being run over by the car. The frame which supports the net is to be elastic, vertically, so as to yield when any portion touches the ground. Such an improvement is greatly needed.

THE American Railway Master Mechanics' Association will convene for their third annual session at Philadelphia on Wednesday, the 14th of September next.

THE Grant Locomotive-Works at Paterson, N. J., manufactured 102 locomotives, and the Danforth Locomotive-Works, at the same place, 76 in the same time. The Rogers Works turned out about 150.

Communication.

EDITOR OF THE NATIONAL CAR-BUILDER:

DEAR SIR: In your August number you invite all practical mechanics interested in car-building to give you their ideas on all subjects connected with that trade; and after inviting all to send grist to your mill, you promise that it shall be "ground and bolted" so that whatever is valuable may be separated from what is worthles sand dispensed for the good of all. Now, it seems to me you have inserted in the aforesaid number of your paper an article which has escaped the bolting process. It is credited to the *American Railway Times*—although it is no *credit* to that paper—and is headed "Construction of Passenger Cars."

Now, as this is a car building subject, and as I am a practical mechanic interested in car-building, I will accept your invitation and give you my views upon it. The first extract I shall make from the article in question is as follows:

"A great majority of the passenger-cars running upon our roads are very insecure, and incapable to resist the effects of an ordinary collision. They are very tasty affairs with their gilding and fancy paint; but if some portion of the expense of these adornments could be used for the purpose of giving additional strength, it would be a vast improvement. There is very little satisfaction in being crushed in one of these gilded murder-traps, when we reflect that, if the expense and pains to render them elegant, light, and airy, had been taken to render them strong and secure, the crushing need not have happened. These flimsy structures are the instruments of a great deal of needless destruction to life and limb, and in the end are very expensive to the railway companies. Some of the managers favor these shabbily-made and insecure cars because they desire to get rid of useless dead-weight; but it must be remembered that dead-weight may be useful when it gives security against disaster; and we must remember that weight, when properly applied in such structures, gives strength, and strength can not be had without it."

This is very sensible, and I am sorry to say it is about all that is sensible in the entire article. The writer next says that "the framing, especially the floor framing, of a large proportion of all passenger-cars is deficient in strength."

This is a sweeping charge against all car-masters, and I do not hesitate to say it is untrue; and if the writer knew any thing about the subject, he ought to have known it to be untrue. He evidently says this in order to make a point, which will appear as we proceed. Again, the writer says,

"The cars built at the shops of the Boston and Lowell line have, in addition to the outside longitudinal sills, six heavy floor-beams running the whole length of the car. These, when properly stiffened by the intermediate cross-pieces, and bolted and secured as they should be, give a platform that it would seem almost impossible to double up or crush together in case of collision."

Now, Mr. Editor, did you ever hear of a car-floor with longitudinal sills, as cars are now generally built and have been for a long time, doubling up or crushing together in case of collision? Is the expression "crush together," as used by the writer, meant to convey the idea that car-floors with longitudinal sills and double flooring *are* literally crushed together when they collide or come in contact—that is, broken into match-splints or flattened against each other as if they were made of putty? Or is all this mere sound and noise, intended to confuse the reader and make him an easy prey to the gammon that follows? The following extract may perhaps furnish an answer:

"Some years since, a broken axle sent a wheel through the bottom of a car, tearing away the entire flooring. A passenger seated directly over the broken floor had the presence of mind to grasp the sill of a window, and saved himself from destruction."

Now let the reader imagine, if he can, how a single wheel sent through the bottom of a car could tear away the entire flooring; the car being filled with *one* passenger seated directly over the entire broken floor, who had the presence of mind to grasp the sill of a window, etc. Further comment is unnecessary on this point, and I pass to the next extract:

"Since then, Mr. Winslow, the Superintendent, has had wide strips of four-inch white-oak plank fastened over the wheels to guard against that possible danger. Although the accident has not been repeated, there can be no doubt that it has been most effectually guarded against for the future."

This is a gross libel on Mr. Winslow; but, fortunately, he is too well known by the car-masters of the country to suffer any detriment thereby. They could not for a moment believe him so stupid as not to know that planking the floors of his cars with four-inch oak, or any other planks, would not prevent damage by broken wheels and axles; and that he is not aware that the only safeguard against such accidents is the six-wheel trucks, and that none other should be used in passenger trains. I do not believe that any sensible man, whether he be a car-builder or not, can be found who would advise the use of eight heavy longitudinal sills in a car-floor, or the lining of the under side of the floor with four-inch oak plank.

The residue of the article is mere prattle made use of by the writer to cover his retreat after making his attack on car-masters, and attempting to sustain it by false statements in regard to one of our ablest railroad superintendents

I wish to notice briefly one other thing in the article from the *Times*. We have already seen that one man covered the entire floor of the car, and that one car-wheel did the same on the under side, from which it would appear that the car was either a very small one, or that the man and wheel were both very large ones. We are told that a load of passengers weighs six tons, which may mean six passengers at one ton each, or forty-eight passengers (a load for a fifty-foot car) at 250 pounds each! Surely the writer knows none but marvelously big men, as well as big stories. One thing is quite plain: he shows himself to possess a very limited knowledge of car-building.

In collisions, the floors of passenger-cars are rarely if ever brought into contact. The breaking down of one of the platforms raises one floor above the other, so that the elevated floor has only the studding and paneling of the next car to check its course. I mention this for the information of the writer of the *Times* article, and all others who talk of "strong floors and strong cars." M. C. B.

Mechanical and Scientific.

A GOOD home-made refrigerator may be constructed by taking two wooden boxes, one large enough to contain the other, leaving a space of two inches between them all around, top and bottom; then bore a hole an inch or so in diameter in the bottom of each for ventilation and drainage; make a lid for each box, and place some slats across the bottom of the larger box for the smaller one to rest upon. The inside box hould have a zinc lining, and legs may be made for the whole resting in tea-cups filled with water to keep out ants and bugs. The refrigerator is then complete.

NEW METHOD OF RAPIDLY DRYING TIMBER.—What is required to be done in order to effectually dry timber? In the first place, it is indispensable that all the soluble particles within its pores be removed, or otherwise they will constitute a cause of dampness and deterioration. They would, in fact, act as a sponge, and absorb and retain a considerable proportion of humidity. By the method to which we draw attention, the soluble matters are first got rid of, and then the drying process thoroughly effected. The operation is commenced by allowing the timber to steep in boiling water for several hours, which removes all the soluble ingredients. At the lapse of this time it is dried, and again steeped or boiled in a weak solution of borax. The object of this is to remove the albuminous particles which will not dissolve out by the simple action of water, like the other more soluble ingredients. The action of the borax, however, produces this desirable result, and the albumen is now got rid of. The final step consists in removing it to a drying-room heated by steam, where it remains three days, at the termination of which it is perfectly dry.

HOW TO CLEAN OIL-CLOTHS.—To *ruin* them, clean them with hot water or soapsuds, and leave them half-wiped, and they will look very bright while wet, but very dingy and dirty when dry, and will soon crack and peel off. But if you wish to *preserve* them, and have them continue to look new and nice, wash them with soft flannel and lukewarm water, and wipe perfectly dry. If you wish them to look extra nice, after they are dry, drop a few spoonfuls of milk over them and rub with a dry cloth.

TO PREVENT THE DECAY OF WOOD.—An English journal gives the following: "A process has been discovered for the prevention of the decay of wood. As the result of a five years' experience, a paint is recommended which at the same time possesses the advantages of being impervious to water. It is composed of fifty parts of tar, five hundred parts of fine white sand, four parts of linseed-oil, one part of the red oxide of copper in its native state, and finally one part of sulphuric acid. In order to manufacture the paint from this multiplicity of materials, the tar, chalk, sand, and oil are first heated in an iron kettle; the oxide and acid are then added with a great deal of caution. The mass is very carefully mixed and applied while hot. When thoroughly dry, this paint is as hard as stone.

TO REMOVE INK-STAINS FROM A BOOK.—To remove ink-stains from a book, first wash the paper with warm water, using a camel's-hair pencil for the purpose. By this means the surface ink is got rid of; the paper must now be wetted with a solution of oxalate of potash, or, better still, oxalic acid, in the proportion of one ounce to half a pint of water. The ink-stains will immediately disappear. Finally, again wash the stained place with clean water, and dry it with white blotting paper.

TO ASCERTAIN THE QUANTITY OF LUMBER IN A LOG.—Multiply the diameter in *inches* at the small end by one half the number of inches, and this product by the length of the log in *feet*, which last product divide by 12. *Example.*—How many feet of lumber can be made from a log which is 36 inches in diameter and 10 feet long? *Solution.*—36 multiplied by 18 equals 648; 648 multiplied by 10 equals 6480; 6480 divided by 12 equals 540.

THE violet ink sold by stationers has a pretty color and flows freely. But in respect to permanency, it is worthless. Writing done with violet ink, if exposed to sunlight, soon fades.

RAILROAD DEPOT AND BRIDGE COATING.—An outside coating for rough brickwalls which at the same time prevents moisture from penetrating through, which is in use by the United States government for painting its light-houses, has recently been applied in several places in this city. It is said to be a good water-proof as well as an excellent substitute for paint for outside walls: Take of fresh Rosendale cement three parts, and of clean, fine sand one part; mix with fresh water thoroughly. This gives a gray or granite color, dark or light, according to the color of the cement. If brick color is desired, add enough Venetian red to the mixture to produce the color. If a very light color is desired, lime may be used with the cement and sand. Care must be taken to have all the ingredients well mixed together. In applying the wash, the wall must be wet with clean fresh water, then follow immediately with the cement wash. This prevents the bricks from absorbing the water from the wash too rapidly and gives time for the cement to set. The wash must be well stirred during the application. The admixture to be made as thick as can be applied conveniently with a whitewash brush. We are assured by those who have used it, that this cement wash will stand for years, that it is admirably suited for brickwork, fences, etc., that it is nearly water-proof, but that it can not be used to advantage over paint or whitewash.

UTILIZATION OF WASTE PRODUCTS.—One of the achievements of modern science is to find a place for every thing and put every thing in its place, so far as what is usually termed "waste" material is concerned. Fusel-oil, putrid cheese, gas-tar, and the drainage of cow-houses are transformed into delicious perfumes; and scraps of tin, old woolen rags, and parings of horses' hoofs are made to yield blue dyes. Fishes' eyes make buds for artificial flowers. Fifty thousand tons of cotton waste are annually worked up (in England) into coarse sheeting, bed-covers, papier-mâché, and common printing-paper. Seaweed furnishes iodine. Raisin stalks are used to clarify vinegar; sawdust finds shapes and services of a thousand different kinds; old horse-shoe nails make the best of musket-barrels. Spent dyewoods are mixed with tar refuse and compressed into cakes for fuel, and scraps of leather are worked into shoddy and used for inner soles of shoes.

Personal.

H. THIELSON, late Chief Engineer of the Burlington and Missouri River R. R., has been appointed General Superintendent of the California and Oregon R. R.

G. C. FRANCISCUS, General Agent of the Pennsylvania R. R., died at Cresson, July 23d. As a tribute of the respect and esteem of those with whom he was associated in the management of the road, a formal order was issued by the general superintendent that the offices at Altoona, and those of the division superintendents, be draped in mourning thirty days.

G. W. N. CUSTIS, formerly Superintendent of the Camden and Atlantic R. R. of New-Jersey, has been appointed General Superintendent of the Mobile and Ohio R. R., in place of L. J. Fleming.

COL. FRED COLBURN, late of the Ohio and Mississippi Railroad, and formerly of the Indianapolis and St. Louis, has been appointed Ticket Agent of the St. Louis, Vandalia, and Terre Haute Railroad, in St. Louis. He is spoken of as one of the best ticket agents living.

T. W. WASON, the noted car-builder, and President of the Wason Car Manufacturing Company at Springfield, Mass., died on Sunday, 21st ultimo, aged fifty-nine years.

WILLIAM D. ROWLEY has been appointed Master Mechanic of the Central Branch Union Pacific R. R., at Atchison, Kansas, in place of W. A. Grubb.

GEORGE S. GRIGGS, Superintendent of Motive Power on the Boston and Providence Railway, died on the 9th ult., aged sixty-five years. He has been one of the most prominent inventors of railway machinery in the country. A railway brake which he invented thirty-six years ago secured him the position of master mechanic on the Providence Road, and came into general use. He also devised the railway coal-burner, patented a locomotive-wheel with steel tire and wood bearings, widely used, and was the first man in New-England that built an eight-wheeled car. He has built for the Providence road 28 locomotives, and all the cars have been constructed under his direction.

THE Davenport *Gazette*, in its description of the Iowa editorial excursion, pays a graceful compliment to Superintendent Knight, of the North-Missouri road. He is, says the *Gazettv*, one of the most efficient railroad supervisors in the whole country. He is modest and reticent, but vigilant and able. Mr. Irish delivered a parting address, most excellent and appropriate, to which Mr. Knight made a brief and feeling response. Every member of the party shook hands with him, and the most beautiful lady in the party—or State, too, for that matter—gave him a kiss in behalf of all the ladies present. He will ever occupy a place in the memory of the excursionists.

DIRECTORY
OF
MASTER MECHANICS AND MASTER CAR-BUILDERS
THROUGHOUT THE UNITED STATES AND CANADA.

A

Railroad.	*Master Mechanic.*	*Master Car-Builder.*	*Residence.*
Albany & Susquehanna	R. C. Blackall	R. C. Blackall	Albany, N. Y.
Atlantic & Great Western		N. H. Marsh	Kent, Ohio.
Atlantic & Gulf	C. Collins	J. Sullivan	Savannah, Ga.
Alexandria & Fredericksburg			Alexandria, Va.
Alabama & Chattanooga	H. M. Smith	H. M. Smith	Chattanooga, Tenn.
Atlantic & North-Carolina	E J. Clayton	E. J. Clayton	New-Berne, N. C.
Atlanta & West-Point	Wm. Rushton		Atlanta, Ga.
Atlanta & West-Point	R. D. Cole		Newnan, Ga.
Atlantic & Pacific			Boston, Mass.
Allegheny Valley	G. W. Glass	R. Gunning	Pittsburg, Pa.
Androscoggin	Ira K. Russell.	C. S. Greenwood	Farmington, Maine.
Adirondack			Saratoga, N. Y.
Alexandria, Loudon & Hampshire	Nathaniel Hayes	Nathaniel Hayes	Alexandria, Va.

B

Bay de Noquet & Marquette	John J. Murphy	H. D. Lyons	Marquette, Mich.
Bangor, Old Town & Milford	J. B. Peckham	John H. Brown	Bangor, Maine.
Bennington & Rutland	John Haining		Rutland, Vt.
Baltimore & Ohio	John C. Davis	John C. Davis	Baltimore, Md.
Bellefonte & Snow Shoe	H. D. Landis	H. D. Landis	Bellefonte, Pa.
Belvidere Delaware	R. McDowell	John Stiver	Lambertville, N. J.
Boston & Albany	Wilson Eddy	F. D Adams	Springfield, Mass.
Boston & Albany	A. B. Underhill	W.E.Chamberlain	Boston, Mass.
Boston & Providence	George S. Griggs	John Lightner	Roxbury, Mass.
Boston, Clinton & Fitchburg	John Webster	Samuel Stevens	Fitchburg, Mass.
Boston, Concord & Montreal	R. Adams	M. R. Elkins	Lake Village, N. H.
Boston & Maine	N. G. Paul		Boston, Mass.
Boston & Maine		D. C. Richardson	Lawrence, Mass.
Boston & Lowell & W. L	L. R. Winslow	S. A. Davis	Boston, Mass.
Blossburg & Corning	O. C. Patchell	O. C. Patchell	Corning, N. Y.
Brockville & Ottawa	Joseph Cockfield	Joseph Cockfield	Brockville, Can.
Blue Ridge			Anderson, S. C.
Burlington & Missouri River	G. Chalender	G. Chalender	Burlington, Iowa.
Burlington, Cedar Rapids & Minn			Cedar Rapids, Iowa.
Buffalo & Erie (see Lake Shore)	William Hart	J. N. Mileham	Buffalo, N. Y.
Buffalo & Washington			Buffalo, N. Y.
Boston, Hartford & Erie	D. Thomas	Elias Pratt	Boston, Mass.
Buffalo, Corry & Pittsburg	Thomas Connell	Thomas Connell	Corry, Pa.
Buff. Bayou, Brazos, Colorado	E. Perry	M. Borst	Harrisburg, Tex.

C

Camden & Amboy	F. B. Stevens		Hoboken.
	T. T. Kerr	E. Lockwood	Bordentown, N. J.
	Thomas Single		South-Amboy.
Camden & Atlantic	E. Collings	S. Wills	Camden, N. J.
Catawissa	A. J. Prescott	G. P. Trustermacher	Catawissa, Pa.
Cape Cod	E. A. Walker	William Cannon	Hyannis, Mass.
Calais & Baring	Chas. W. Butler	Chas. W. Butler	Milltown, Me.
Cascade	E. Copley	James Smith	Cascades, W. T.
Catasauqua & Fogelsville	Thomas Evans	Chas. S. Holbach	Catasauqua, Pa.
Carrolton & Oneida	M. T. Wiggins		Carrolton, Ohio.
Charleston & Savannah	H. T. Calder		Charleston, S. C.
Chesapeake & Ohio	W. G. Freeman	J. N. King	Richmond, Va.
Cheraw & Darlington			Cheraw, S. C.
Champlain Trans. Co	H. T. Calder		Burlington, Vt.
Cheshire	F. A. Perry	F. A. Perry	Keene, N. H.
Charlotte & South-Carolina	T. D. Kline	W. T. Brown	Columbia, S. C.
Chicago & North-western			Chicago, Ill.
Chicago & North-western		Thomas Hull	Chicago, Ill.
Wiscon. Mad. & Mill. Divis		Henry Hull	Fond du Lac, Mr.
Galena Division	R. W. Bushnell	Hugh Gray	Chicago, Ill.
Chicago & N. W. Iowa Division	C. C. Elliott	William Campbell	Clinton, Iowa.
Chicago & N. W. Peninsula Division	S. L Pierce		Escanaba.
Chicago & Alton	John A. Jackman	R. Reniff	Bloomington, Ill.
Chicago, Burlington & Quincy	C. F. Jauriet	W. W. Wilcox	Aurora, Ill.
Chicago, Cincinnati & Louisville	C F. Kidder	D. B Howe	La Porte, Ind.
Chicago, Rock Island & Pacific	T. B. Twombly	J. I. Fogg	Chicago, Ill.
Cleveland, Col., Cin., & Indianapolis	W. F. Smith	William Cleve	Cleveland, Ohio.
Cleveland and Pittsburg	N. E. Chapman	N. E. Chapman	Cleveland, Ohio.
Cleveland, Zanesville & Cincinnati	J. W. Holloway	J. W. Holloway	Akron, Ohio.
Cincinnati, Hamilton & Dayton	William Cullen.	W. H. Allison	Cincinnati, Ohio.
Cincinnati & Zanesville	Peter Green	D. J. Jewell	Lancaster, Ohio.
Cincinnati & Indianapolis Junction	O. H. P. Little	W. W. Degnacey.	Cambridge, Ind.
Cincinnati, Sandusky & Cleveland	Wm. Swanston	William Earick	Sandusky, Ohio.
Concord	E. Studley	M. W. Dickerman	Concord, N. H.
Concord & Claremont	J. N. Lander	A. Langmaid	Concord, N H.
Council Bluffs & St. Joseph	Myron Ellis		Council Bluffs, Iowa.
Connecticut River	John Mulligan	J. Hitchcock	Springfield, Mass.
Contoocook River			Concord, N. H.
Conn. & Passumpsic Rivers	Horace Alden	Horace Alden	Lyndon, Vt.
Cumberland Valley	A. S. Hull	C. W. Nitterhouse	Chambersburg, Pa.
Cumberland & Pennsylvania	W. L. Jordan	N. Binnix	Mt. Savage, Md.
Central of Georgia	B. L. Boulineau	C. C. Millar	Savannah, Ga
Central of New-Jersey	†T. S. Peeples	George Hackett	Elizabethport, N. J.
Central Branch Union Pacific	Wm. D. Rowley	W. A. Grubb	Atchison, Kansas.
Central R. R. of Iowa	H. P. Vedder	H. P. Vedder	Elden, Iowa
Central Pacific	E. T. Perkins	E. T. Perkins	Sacramento, Cal.

D

Dayton & Union	A. J. Keenan	J. F. Feicht	Dayton, Ohio.
Danbury & Norwalk	Charles A. Craig	Wm. W. Bedient	Danbury, Ct.
Dayton & Michigan	William Cullen,	W. H. Allison	Cincinnatti, Ohio.
Delaware, Lackawanna & Western	William Dawson	A. Overbagh	Scranton, Pa
Des Moines Valley	Morris Sellers	R. E. Smith	Keokuk, Iowa.
Detroit & Milwaukee	B. Briscoe	B. Briscoe	Detroit, Mich.
Delaware & Hudson Canal Co	James Dickson	Thomas Orchard	Carbondale, Pa.
Dorchester & Delaware			Cambridge, Md.
Dubuque South-western	J. M. Williamson	J. M. Williamson	Farley, Iowa.
Dutchess & Columbia			Washington, N. Y.

E

Eastern		J. P. Somerby	Salem, Mass.
Eastern	John Thompson		East-Boston, Mass.
East-Tennessee & Virginia	Jos. Armbruster	Jos. Armbruster	Knoxville, Tenn.
East-Tennessee & Georgia	Eli Hixon		Knoxville, Tenn.
East-Pennsylvania	J. M. Geary	Samuel Reeves	Reading, Pa.
Erie Railway	*E. O. Hill		Susquehanna, N. Y.
Erie Railway	H. L. Brown	C. A. Smith	Jersey City, N. J.
Erie Railway	M. E. Brown	M. Wilder	Buffalo, N. Y.
Erie Railway	W. E. Cooper	W. E. Cooper	Dunkirk, N. Y.
Erie Railway		W. E. Rutter	Elmira, N. Y.
Evansville & Crawfordsville	John L. White	A. Sharra (fore'n).	Evansville, Ind.
Evansville, Henderson & Nashville	W. H. McCafferty.	W. H. McCafferty.	Nashvi le Tenn.
European & North Am. (of Maine)	A. O. Bailey	J. H. Brown	Oldtown, Maine.
Erie & Pittsburg	John Young	John Young	Erie, Pa.
Eldora			Dubuque, Iowa.

F

Florida	J. G. Chalk	G. Hernandez	Tallahassee, Fla
Flint & Pere Marquette	Sanford Keeler	Sanford Keeler	East-Saginaw, Mich.
Fitchburg	Geo. A. Cooledge.	Enos Varney	Charlestown, Mass.
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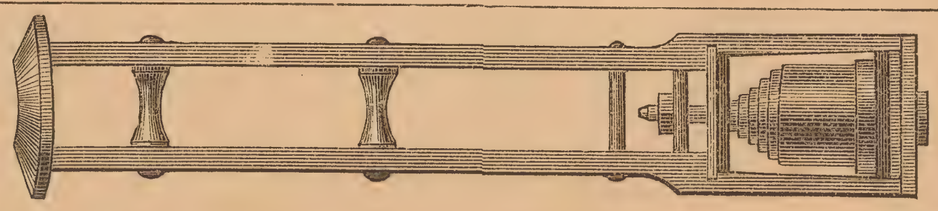

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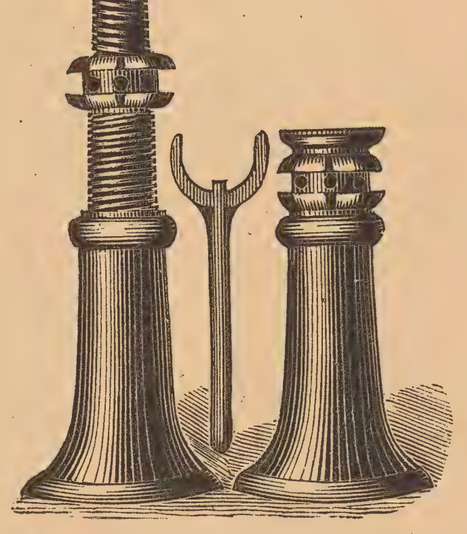

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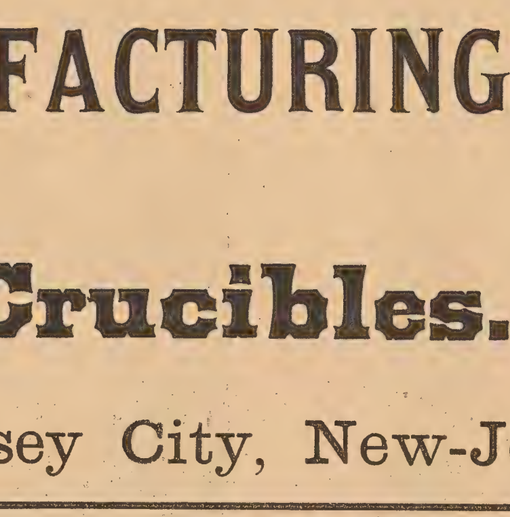

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Editorial Announcements.

Correspondence.—*We cordially invite the coöperation of the railroad public in affording us the material for a good mechanical paper. Articles relating to rolling stock and machinery, by those practically acquainted with those subjects, will be gratefully received. All communications must be addressed to Vose, Dinsmore & Co., No.* 1 *Barclay Street.*

The name and address of the writer must accompany all communications designed for publication.

Advertisements.—*A limited number of advertisements will be inserted on the cover. Rates made known on application.*

All communications in regard to advertising should be addressed to L. F. Dinsmore, *Post-Office Box* 4055, *New-York City, who is our agent for advertising, and authorized to make contracts, collections, etc.*

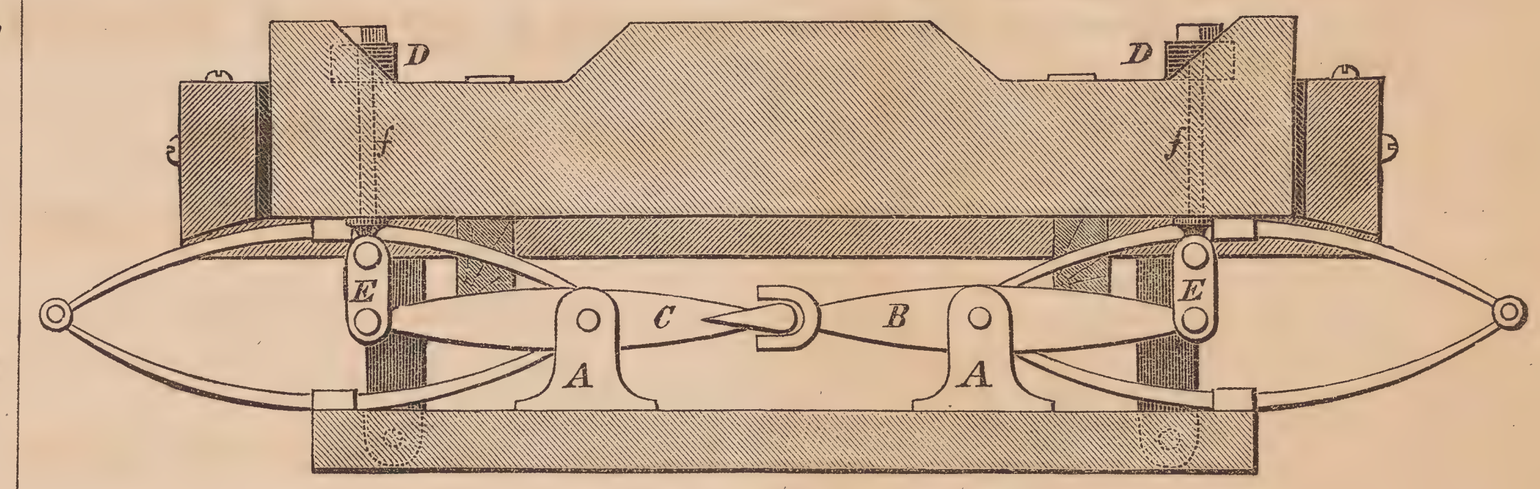
Engravings and Illustrations.

We would invite the attention of Master Car-Builders and others to the advantages to be derived from publishing in The National Car-Builder *engravings designed to illustrate the various features and details of car construction, and especially such improvements as can not otherwise be clearly presented. We will procure cuts to be made in the best manner from drawings or models that may be sent us, and charge only for the cost of engraving, inserting the same in our paper with suitable descriptive details, without charge. The cuts thus made by us, or that may be sent us for use in* The National Car-Builder, *will of course be returned promptly to the owner.*

The third article of the interesting series entitled "Historical Sketch of Railway Cars," will appear in our next number.

Car-Painters' Association.

A meeting of the master car-painters of the United States has been called for the purpose of organizing an association with a view of promoting the interests of the craft by discussion and exchange of views. The meeting will be held in Boston, at Preble Hall, 176 Tremont street, November 9th.



Equalizing-Lever for Swing-Beam.

Equalizing-Lever for Swing-Beam.

Mr. Charles Graham, of Kingston, Luzerne County, Pa., has shown us a model of a four-wheel car-truck designed by himself for the purpose of equalizing the bearing while trains are passing curves, or when passengers get upon one side of the car to avoid the sun, or for other cause; and also to prevent the unpleasant oscillation or rocking of cars arising from an unequal distribution of their weight upon the bearing-surfaces of the truck. The working of this simple but ingenious device will be readily understood by a glance at the engraving, which presents a sectional view of the truck and all the peculiar features of its construction. The car is attached to the swing-beam or bolster by a central bolt as usual, and also rests upon the outer ends of the beam, which are supported by two elliptic springs underneath. The beam is also attached to the outside arms of a pair of levers B C, which rest upon their fulcrums A A, and act upon each other by means of a socket connection of their inside arms. In passing a curve, an unequal proportion of the weight of the car—when running on a truck of ordinary construction—is thrown upon one side, depressing the springs upon that side and relieving them on the other. But by means of this device, the unequal pressure upon one side forces down the arm of the lever underneath, which acts upon the other lever by means of the socket connection, and produces a corresponding depression on the opposite side. The beam is thus kept in a uniform position corresponding with the level of the truck-frame. The outside arms of the levers are connected with the beam by two links E E, and the bolts *f f*, the latter passing through India-rubber springs D D, inserted in the swing-beam, making an easy action and avoiding concussion.

The practical effect of this arrangement is to secure at all times an equal distribution of the weight of the car upon both sets of springs, so that neither shall, from causes above referred to, be alternately relieved and overburdened. The chief advantage resulting therefrom is to diminish to a very great degree, if not altogether, the disagreeable oscillating or rocking motion so often experienced and complained of. It is claimed in behalf of this device, that inasmuch as not more than half the weight of the car can at any time fall on one side—the residue or excess being transferred by the action of the levers to the opposite side—lighter elliptics can therefore be used, with a diminution of cost and dead-weight; but it seems to us that what is gained in this respect is offset by the cost and weight of the levers. We have little doubt, however, of its practical utility in its application to four-wheel trucks. We are informed that it has been tested on the Lackawanna and Bloomsburg Railroad with the most satisfactory results.

Improvement in Horse-Cars.

It is well known to persons familiar with the operation of street railroads that the most laborious part of the horses' work is to get a car under headway from a dead stop, and that this alone wears and strains horses more than all their other work. This is especially the case on an up-grade, since it is almost impossible to let go the brake at just the right moment, or soon enough to avoid having the horses draw against the brake and at the same time prevent the car running back, thus adding to the draught. A remedy, it appears, has at length been found in an apparatus which was first tried upon a car of the Troy and Albany Horse Railway Company, and was very successful. The apparatus has since been attached to a car of the State Street Railway.

The device consists of a ratchet-wheel, fixed to the axle of the car, and a lever, provided with a pawl and operated by a chain and rod, through the medium of an eccentric pulley attached to the bottom of the car; the rod connects with a sliding-bar, beneath the platform, forming a hook at its outer end, to which the horses are attached in the usual manner.

It is designed to attach the mechanism to each axle of a car so as to operate in both directions. When the car is reversed, the pawl is raised from the ratchet-wheel by means of a cord extending to the rear platform, and thus can interfere in no way with the motion of the car in the other direction. The object of the invention is to equalize the draught, so that in starting a car the resistance would be no greater than in running it, and this result they have apparently attained.—*Albany Journal.*

Chicago and St. Louis Railroad.

THE *Chicago Railway Review* thus notices the superior passenger equipment of this road, the car department of which is under the superintendence of Mr. R. Reniff: "Not only was this company among the very first to consult the wants of the comparatively few in providing improved sleeping-cars, but at the same time its experienced managers studied the *popular* want in the improvements which they introduced into ordinary cars. Attention was first turned to the perfection of coupling, brakes, and bearing—the three prime things on which the safety and comfort of the passenger depend. The Blackstone coupler and platform we have already described, and have often commended for its strength and durability, and the perfect adequateness of its security; the efficiency of the Creamer brake is established beyond question; and, as regards the trucks, we know of none which secure an easier and more undisturbed and equable carriage.

"Along with these prime improvements, the public convenience and taste have been no less carefully and successfully studied. The result is seen in a day-car on exhibition at the St. Louis Fair—on the model of which the entire passenger equipment of the line is to be rapidly reconstructed and built. These cars—in addition to the features above noted—run on 12-wheel trucks, the wheels having Grigg's patent steel tire; and they are elegantly carpeted, and are lighted with gas.

"Built in the shops of the company, and the product of the ripest mechanical skill; constructed in every part of the best possible material, and every part designed and finished with the utmost care—these palaces for the people cost, notwithstanding the economy with which materials are obtained and work done, twelve thousand dollars each. Here is a sum expended on a day-car nearly equal to the average outlay on first-class sleeping-cars. But we commend the liberality that prompts the outlay. It is not expended for the gratification of the few merely who are willing to pay extra for exclusive accommodations and special favors; it is expended to meet the wants of the traveling public at large.

"Along with this superb day equipment, the most improved Pullman sleeping-cars will be kept on the road; and the Pullman dining-cars, which were first introduced on this line, and have long been among its special attractions, will continue to run in connection with all through trains."

WE have read several obituary notices of the Green wich street elevated railway, but it seems they are premature. The directors of the enterprise intimate that they are convinced from their experimental trials with a single track, that the thing would pay handsomely if the track were double. They claim to have carried twenty thousand passengers while experimenting, and now they propose to extend the track to Central Park, and add ten new cars to their rolling stock. There is nothing, in the long run, like perseverance.

THE Erie Railway Company is building at its car-shops in Jersey City six elegant passenger sleeping-coaches. They are being constructed under the direction of Mr. C. A. Smith, and will be replete with every detail for promoting the comfort of passengers. The interior finish is exceedingly elaborate and beautiful; the display of choice woods and ornamental carving being equaled only by the rich and elegant upholstery. They are rapidly approaching completion, and we shall at an early day give a full and detailed description of them.

CORK is such a poor conductor of heat that it is largely employed about steam-engines to prevent the cooling of cylinders, and the consequent larger consumption of fuel. According to careful experiments, the economy in fuel amounts to $2 for every thirty-two square metres of surface protected. Experiments conducted by M. Steubel, of Berlin, with locomotives, gave also entirely satisfactory results.

The Finishing and Decoration of Machinery.

EVERY body prefers to look at beautiful things rather than at those unattractive in their appearance; but in things made not with a special design to be looked at and admired, but to be used, it has been questionable in the minds of many whether it is not better to avoid much attempt at decoration or ornamental design, both for the sake of cheapness in initial cost, and the saving of subsequent labor to preserve the beauty of such articles when in actual use.

As usual, there are extremists on both sides of this question, and the truth lies in a mean between the elaborate decoration which some would advocate, and the total neglect of adornment which would suit the views of others.

For ourselves, we are always gratified to see an elegant design and finish in a machine, even when it is employed to do rude work; but elegance of design does not always mean elaboration.

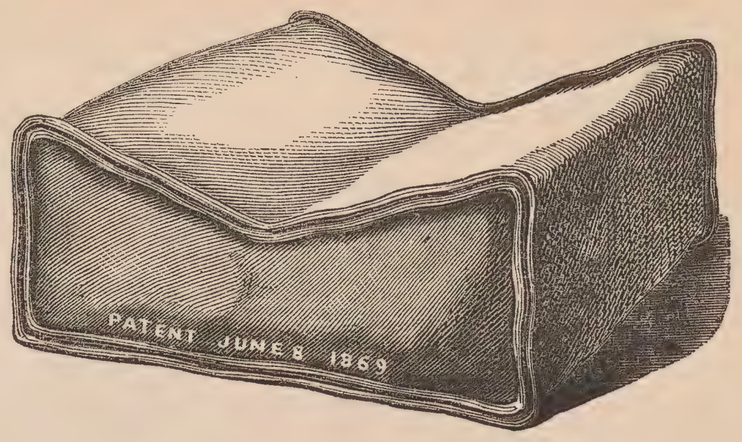
The question of fitness is one which should greatly influence all consideration of ornament. Nothing looks well out of place. A cluster of roses looks very pretty in the centre of a panel of an enameled bedstead. On the blade of a barn-shovel such an ornament would be simply ridiculous. The cloth-plate of a sewing-machine may be highly decorated, and such decoration is in perfect good taste. Sewing-machines are much used amid surroundings of beautiful objects. Beautiful textures are wrought upon them, and no incongruity results from ornamentation of such machines designed to be used in the household.

We confess that the hose-carts now used by the fire departments of our principal cities, in connection with steam fire-engines, appear to us much more appropriate with their almost entire absence of ornamentation than the elaborately adorned ones formerly in vogue under the volunteer fire company system. Those now employed are made for service, and not for show, and their fitness for the purpose to which they are applied is an element of comeliness which more than compensates for the absence of gay colors and the glitter of polished metal.

It is because we deem elaborate ornament entirely out of place on locomotives that we regard the reform in this particular now in progress on American roads as a step in the right direction. Our sense of the fitness of things has always received a shock when we have seen a highly decorated locomotive dash besmirched and dingy into a railway depot. A "sweep" could as appropriately put on a shirt of "snaw-white seventeen-hunder linen," in a preparation for the cleansing of a kitchen-chimney, as a manufacturer of a locomotive could lavish thereon the ornate display we deprecate, which, besides being out of place, is an element of expense, and an entailment of increased labor in caring for the costly machine.

But while we find fault with extravagant and incongruous ornament, it will not do to ignore the fact that a machine appropriately decorated stands a much better chance of being well cared for than one totally destitute of attractiveness in appearance. The reflex effect of a beautiful design in a machine will unconsciously influence its attendants, and beget in them increased neatness and care. So there is possibly a danger that in stripping locomotives of their inappropriate and elaborate finish, the other extreme may be adopted, and what would not only be appropriate but useful in its effects may be neglected.—*Scientific American.*

ARABIAN SUBSTITUTE FOR GLUE.—Instead of common glue, the joiners of Tunis, Tripoli, etc., frequently use a preparation of cheese, which is first pounded with a little water in a mortar till the wheyey matter is washed out. When this is done, they pound it again with a small quantity of fine lime; and apply it afterward, as quickly as possible, to such boards as are to be joined together, which, after the cement becomes dry, can not afterward be separated without the greatest difficulty.



Devlan's Journal-Box Lubricator.

IN operating our railways, there is no single nuisance so inveterate, and, apparently, so difficult to get rid of, as hot boxes; and we have already printed so much upon the subject in the form of selections and contributions embodying plans, devices, suggestions, and theories, that we had thought of devoting a special department of our paper to the discussion of this one topic. Although the journal-boxes still continue to blaze as vigorously as ever, we still think a remedy will sooner or later be discovered. We do not know that we have hit upon the right one in what we are about to recommend, but we think if those who have charge of railway rolling stock will take the trouble to give "Devlan's Patent Journal-Box Lubricator" a fair trial, they will have no reason to regret it. The thing itself has such a nondescript shape, that a cut of it conveys a very imperfect idea of its quality. We give, nevertheless, an engraved illustration, and think it can be comprehended with the aid of a little explanation.

The "Lubricator" consists of a pad or cushion—some might call it a saddle—corresponding to the length of the journal, made of wool and hair combined expressly for the purpose, and filled with prepared elastic sponge, which does not lose its elasticity and is not liable to harden or decay. This pad, before being put in the boxes, is saturated with oil in the same manner as waste; the sponge holding the oil in a state of absorption, and supplying it to the journal as fast as required. The elastic nature of the material keeps the pad always up to its place, which is not the case with waste, which has no elasticity, and must be packed tight to keep it up to the journal. The pad also allows a more free circulation of air around the journal than waste will admit of, which does much to prevent heating, and will run at least a year without being renewed, saving a number of oilings as compared with waste, and a corresponding quantity of oil. If the boxes are in good order, the pad lubricators will run three months or more without reoiling; and one man can pack a hundred cars with them in a great deal less time than he can do it with waste.

We briefly alluded to this remedy for hot boxes in our September number, since which we have received additional evidence confirming what we have said in its favor. It has but recently been introduced, and like all other new devices in mechanics, must encounter more or less of rivalry and prejudice. We only suggest that it be fairly tested, and approved or condemned upon its intrinsic merits.

THE Pacific Railway runs through nineteen tunnels between Omaha and San Francisco.

THE bridge of the Columbus, Chicago, and Indiana Central Railway over the Whitewater, at Richmond, Indiana, was destroyed by fire on Saturday morning, May 28th; and on the evening of the Saturday following, the new bridge was completed and ready for the crossing of trains.

THE Ohio Falls Car Company's works, at Jeffersonville, Ind., opposite Louisville, have recently turned out some remarkably elegant cars. About six hundred men are employed in the works, which have orders enough to keep them all busy.

Railway Master Mechanics' Association.

We give below the essential part of the proceedings of this association at its late meeting in Philadelphia, being the reports of the various committees upon the subjects assigned to them.

REPORT ON BOILERS AND BOILER-PLATES.

The Committee on Boilers and Boiler-Plates made a report, in which they argue that it would be well to still further encourage the invention of appliances to promote superior evaporation by the consumption of smoke and various valuable gases, which now escape in part or altogether from railway locomotives. Mr. Boole, an eminent engineer, recommends that in the construction of boilers as few seams as possible should be presented to the water-surface, which recommendation the committee indorse. It is evident that very soon bituminous coal will be the standard fuel for railroad locomotives, and they should be generally constructed for the use of coal. It is found that the American railway locomotive has no superior in the world, and that the boasted English engine could not compete with our engine on our roads, however successful they may be in Europe. The engineers in South America say that the English locomotive is a sturdy, cumbersome machine upon four legs, while the American engine is superior and runs upon three legs, which is a great advantage.

The committee recommend that there be no increase in the length of boiler-tubes. As to the area of grate-surface, and the area between boiler-tubes, no positive rules can be laid down. A great deal depends upon the character of the fuel used. A free-burning coal requires a large area of grate-surface, while a slow and steady-burning coal should be used with a smaller surface. From eighteen to thirty-six inches of grate-surface is required for close-burning coal. The committee think that the subject of different depths of coal in engine-furnaces should be thoroughly investigated. The committee recommend the use of steel furnace and flue-plates for coal-burning locomotives. The superiority of homogeneous steel for these purposes is established. The labor on locomotives is very costly, and, therefore, metals of the best quality should be used in their construction, if only for the sake of economy. Some steel plates were examined after ten years' use, and were found to be in good condition. Copper or iron plates do not last, blistering being a fruitful source of trouble with the latter. Steel-plate manufacturers are now supplying an excellent article. Formerly those made were found to be porous and subject to cracking, but now no defective plates are furnished, as all are manufactured from crucible steel, and are thoroughly tested before they are fitted.

The manufacture of steel boiler-plates by the Bessemer process has commenced, but as yet there has been no satisfactory trial of them made. Those in use seem to possess the requisite toughness and hardness. It is believed that in the end steel plates for boilers will be found the cheapest. The committee have received a letter from an eminent French engineer relative to the construction of locomotive boilers and their use in France, Austria, Belgium, and Italy. In those countries steel boiler-plates are a perfect success. English and Westphalia steel is used, 49-100 of an inch thick. The metal used must be of the kind that hardens in the plates, but does not harden in the rivets. The steel from Sheffield is the best. The locomotives on the Austrian railways weigh twenty-one tons, and have steel boiler-plates less than half an inch thick, which have been used for five years, and are now in good condition. All of the continental locomotive boilers are now made thicker than they were before, with double rows of rivets placed zigzag. The distance from centre to centre of the rivets in the same line is four inches.

Mr. Sellers, referring to the report of the Committee on Boiler-Plates, said he did not think boilers could be constructed perfectly safe and tight with plates half an inch thick and rivets four inches apart.

Mr. Hayes explained that the committee gave this information as coming from an eminent French engineer, and not as their own report. It should be borne in mind that the rivets, although reported to be four inches apart, were really only two and a quarter inches from centre to centre, as they were inserted in zigzag lines.

REPORT ON CYLINDER AND STUFFING-BOX PACKING.

The Committee on Cylinder and Stuffing-Box Packing made a report, in which it was stated that reports had been received from twenty-four companies using spring packing, and thirty companies using steam packing. With pressure enough to keep it up to the rings in the cylinder, spring packing is reported to be the most economical. It is also clear that certain kinds of steam packing wear the cylinders very unevenly. Upon the question of the superiority of the two patent steam packings no opinion could be given, as twenty-one master mechanics favored Dunbar's and twenty were in favor of Stevens's. The chairman of the committee having the casting vote, gave it in favor of the Dunbar packing; but he did so conditionally, as he merely desired to thereby bring the question forward in a more positive shape.

The report was received and the committee discharged.

REPORT ON CONSTRUCTION OF FURNACES.

The Committee on the Construction of Furnaces made a report, in which they state that they have received no important suggestions as to the furnaces used in engines using anthracite coal. Many of the improvements in furnaces and fire-boxes have not proved successful. Tests of the brick arches of Buchanan, Weston, Jauriet, and others have been reported, and it appears that weakness is the only objection to them. Great difficulty is experienced in raising the standard of combustion. The Weston fire-box is the best for the promotion of the ignition of gases. It burns the fuel very clear, and very little smoke escapes. The fire-box of Buchanan is also recommended for certain special advantages. It has been used with satisfaction on the Hudson River Railroad. The fire-box of Mr. Jauriet, of the Chicago, Burlington, and Quincy Railroad, is perhaps the best. It effects a saving of forty per centum in fuel. The coal used is from the Illinois mines, and, as these mines supply the coal for the roads in Illinois principally, this is a great desideratum, as it is absolutely necessary that economy should be practiced in consequence of a somewhat inadequate supply.

Mr. Benton, of St. Louis, has invented a very economic fire-box with an admirable deflector. The report is signed by E. O. Hill and James Sedgeley, and was received and filed. The committee was continued for another year. Mr. Sedgeley asked and received permission to retire from the committee, on account of the fact that his company uses wood-burning locomotives only. Mr. H. A. Little, of the Peoria, Pekin, and Jacksonville Railroad, was appointed a member of the committee in place of Mr. Sedgeley, retired.

In connection with the report of the committee a paper was read by Mr. Sellers, which was an able and exhaustive scientific essay on combustion in locomotives. Also an able paper relating to the consumption of coal in connection with furnace-surface, written by Mr. L. W. Towne, of the Hannibal and St. Joseph Railroad.

REPORT ON SLIDE-VALVES.

Mr. Thompson presented the report of the Committee on Lap and Lead of Slide-Valves. It sets forth that the investigation was a most important one, which would require more time for the consideration, especially of the branches relating to questions of grade, weight of engine, etc. The committee had considered the matter only in the light of general practice thus far. Our inquiries have been confined to the outside lap, inside lap, travel of valve, and lead in full gear. Circulars had been sent to one hundred and sixty master mechanics, and answers had been received from thirty-five.

[On the subjects of steel tires, axles, and wheels, we are informed that a more full and complete report will be contained in the official proceedings to be published hereafter by the secretary, and we therefore omit the partial one already published.]

BOILER-FLUES.

Mr. Jauriet presented the report of the Committee on Material for Flues. A large number of answers to the circulars sent out had been received. The majority of master mechanics favor copper for wood-burning locomotives, and iron for coal-burning engines. Steel tubes appear to give general satisfaction, especially upon coal-burning locomotives. Some of these have been used for seven years, and do not show any wear. Iron tubes came next in order of favor when fitted with a copper thimble as a seat in the flue-sheet. Brass and copper tubes are recommended for wood-burning locomotives. One brass tube, which has been used for twenty years, shows no signs of wear, while another was found to be worn out after four years' use. The different metals have the same effect in generating steam, although copper is known to be a superior conductor of heat. There should be no increase of thickness in the manufacture of tubes. The committee ask that the investigation of the subject of steel flues be continued. The amount of scale formed is the same in all metals. Steel and copper seem to accumulate the least scale, and are, therefore, preferable.

The report was received and the committee discharged.

DEAD-WEIGHT OF ROLLING STOCK.

Mr. Meier presented the report of the Committee on the Dead-Weight of Rolling Stock. This question, in the opinion of the committee, is one of great importance. There appears to be no remedy for the great evil of over-weight. Answers to the circulars sent out came in sparsely, but most of those received favor a reduction of the weight of locomotives. The usual weight of a locomotive is 58,125 pounds; average weight in the truck of an engine, 16,408 pounds. The average useful weight on drivers is 41,717 pounds, or as 100 to 255, hence the average total weight of engine, with tender loaded, is 101,713 pounds; average weight on the truck, 18,499 pounds; average weight of tender, with water and fuel, 39,267 pounds; average dead-weight, 57,776 pounds; average useful weight on drivers, 43,937 pounds, or as 100 to 76. Baker's cylinder is recommended by the committee, as combining steam-chest, cylinder, and one half of the saddle in one casting makes a considerable reduction in the weight.

Wrought-iron, or steel steam-pipes might recommend themselves, but as yet steel is impracticable for cylinder and saddle castings. The committee recommended an investigation of the subject of steel flues. A great many new locomotives are defective in weight, and there is too much stiffness in the springs. The weight is two thousand three hundred pounds per wheel. Better arrangements should be made for taking in fuel and water, as well as for economy in this matter of dead-weight. The improved locomotives of Mr. Hudson, of the Rogers Locomotive-Works, and those of Mr. Forney and Fairlie, are recommended by the committee. The carrying of too much water is always to be avoided. The average weight in the front truck is set down at sixteen thousand three hundred and sixty-eight pounds. The best foreign engines have a higher average than this. Some means for the consumption of smoke and gases is greatly needed on our locomotives. This would enable us to carry less fuel. Steel is recommended for pistons, piston-rods, and rod-heads, as its durability will make it unnecessary to use so much metal as at present where iron and copper are employed.

THE FAIRLIE ENGINE.

Fairlie's engine has less wheels and boxes to oil and carry, but the driver requires two assistants. The owner says it will draw eighty-eight cars, at good speed, with less oscillation than other engines. As to

cars, there seems to be no way of lessening the dead-weight. We travel every distance here, and we arrange our passenger-cars for easy, safe, and comfortable traveling. Our day and sleeping-cars are unequaled in the world for strength, magnificence, and comfort. The dead-weight of these is very great—not less than 450 pounds per passenger, nor more than 1000 pounds. The people seem to be opposed to reducing this weight, and like our heavy carriages best, because they run steadily, easily, and are comfortable. Iron trucks are recommended as being lighter than wooden ones, in comparison to strength and durability. These weigh 18,360 pounds per car, 37 4-5 per centum of which is dead-weight. English carriages have 33 per centum dead-weight.

The report was received and the committee discharged.

REPORT ON BOILER EXPLOSIONS.

Mr. Losey presented the report of the Committee on Boiler Explosions. No positive cause or rational theory has been presented for boiler explosions. They can only be likened to an avalanche. A small handful of snow, falling upon the mountain side, rolls on and increases until it becomes of immense size, and destroys all that comes in contact with it. Experiments made after accidents show that the weakest part of the boiler always gives way first. These explosions are known to result from over-pressure in many instances, but we have no way to regulate this pressure to a nicety. Low-pressure boilers frequently explode with the most disastrous results. Two thousand feet per second is the rate of the velocity of steam rushing out of a rupture. The force is always sufficient to rend a boiler where a rupture exists. A majority of the boilers exploding now burst upward, the crown-sheet giving way first. By promptly releasing the steam a rupture may not lead to an explosion. Boilers have been known to serve well with defective sheets, but these should always be condemned.

The percussive force of steam is to-day absolutely independent of all known rules of government. Tubular boilers have been discarded on the Western river steamboats, because the great heating-surface rendered them more liable to disaster than others. There are good and strong causes observed for many explosions, but some of them are perfectly inexplicable.

The report was received and the committee discharged.

Mr. Sellers said he desired to get an expression of opinion relative to the periodical testing of boilers by hydraulic pressure.

Mr. Hudson said that the idea that the water in the boiler is the same temperature as the steam above it was erroneous. The concussive pressure in the boiler agrees with the amount of heat in the water. He thought if we could make our boilers perfectly cylindrical they would not explode. The weakness of boilers lies in the laps and longitudinal seams. When the weakness occurs, it is the impact of the water which makes the explosion so terrible. The taking up of heat from suddenly heated plates by water leads to a generation of steam of such strength, elasticity, and pressure that no safety-valve can relieve it. This is frequently the true cause of explosions. No hydraulic pressure test can be relied upon. It may be a test just four pounds below the exploding point, and it is useless. There is but one way to get up a perfectly or reasonably safe steam boiler. You must use the very best material; it must be manufactured in the most approved manner; and after the boiler is well constructed, it must be handled carefully and be well taken care of. This is positively the only security that we have against steam boiler explosions. [Loud and long-continued applause.]

COLD ROLLED SHAFTING.

Mr. Sellers presented the report of the Committee on Cold Rolled Shafting. Upon the subject of the use of cold rolled iron in guide-rods, etc., the committee have no reliable data. In shafting its use is increasing, and it is recommended for its cheapness, as it requires but little labor to work it up. Its wearing qualities are superior, and its toughness is marked. It has great strength, and is not subject to oxidization. It is admirably adapted for piston rods; and it is shown that rods made of cold rolled iron do not require turning at frequent intervals. Experiments made under the auspices of the Franklin Institute, of Philadelphia, show that it has great tension strength, but rather less than that of steel. It is superior to hammered or twisted iron. The objection to cold rolled iron for shafts is that it is liable to spring when key-seated; but this, the committee think, can be avoided in future manufacture and management.

The report was received, and the committee continued.

SUBJECTS FOR DISCUSSION.

The following topics for discussion and inquiry were added to the regular list:

"On the practicability of placing indicators on engines, to ascertain the number of revolutions made by drivers."

"On ascertaining the merits of steel for links, guides, and crank-pins, as compared with the best quality of iron case-hardened.

"What proportion should the surface of the water in the boiler bear to that of heating-surface, and what should the amount of steam-space be for a given heating-surface to insure the best results?"

COMMITTEES.

Messrs. Reuben Wells, Jacob Losey, and John Skidmore were appointed a committee to make arrangements for holding the next session.

The following committees on topics for discussion were then appointed:

On boilers and boiler materials—Messrs. Hayes, Anderson, and Jauriet.

On steel tires, wheels, and axles—Messrs. Perry, Wiggan, and Lander.

On cylinder and stuffing-box packing — Messrs. Heynes, Robinett, and McFarland.

On boiler incrustations—Messrs. Towne, Boone, and Marston.

On safety-valves—Messrs. Wells, Setchell, and Nesbitt.

On boiler explosions—Messrs. Losey, Gale, and Little.

On dead-weight of rolling stock—Messrs. Meier, Benton, and Gibbs.

On construction of furnaces—Messrs. Hill, Smith, and Little.

On lap and lead of slide-valves—Messrs. Thompson, Coolidge, Nesbitt, and Garfield.

On style of engine for freight service—Messrs. Shafer, Cummings, and Rennie.

On finance—Messrs. Britton, Sedgeley, Smith, and Boone.

On indicators for revolutions—Messrs. Hudson, Leach, and Williams.

On merits of steel for crank-pins—Messrs. Ham, Gregg, and Strong.

On water-surface in boilers — Messrs. Philbrick, Jackson, and Hill.

On lubricating-oils—Messrs. Burke, De Clercq, and Bushwell.

The Committee on Resolutions reported in highly complimentary terms to the Philadelphians, tendering the thanks of the association for their generous hospitality, congratulating them for their success in the mechanic arts, and offering thanks also to the press and the railroads.

On motion, the convention adjourned, to meet at Louisville on the second Tuesday in September, 1871.

THE Findlay (Ohio) *Courier* remarks, "It is pleasant for lovers to sit on the porch these evenings, and be happy in the thought that their blood is commingling in the same mosquito."

Speech at the Master Mechanics' Banquet.

AT the banquet given by the manufacturers of Philadelphia to the master mechanics, during their recent convention in Philadelphia, the following address was made by the chairman, Joseph Harrison, Jr.:

FELLOW RAILWAY MASTER MECHANICS AND GENTLEMEN: Through the kindness of partial friends among those who have been most active in promoting the object that has brought us together to-night, the honor has devolved upon me of presiding at this board. A fitter man had been selected to fill the place I now occupy, one more closely connected with the commencement and the development of the great railways of our State. But an all-wise Providence called him hence ere the time arrived for this most pleasant meeting. In turning to this portrait draped in black, I need but mention the name of Samuel V. Merrick.

A railway engineer myself, schooled in the practical operations of the workshop and the road for a great portion of my life, I can not but feel flattered by the distinction that has been conferred upon me, in being permitted to stand here to welcome the association of American Railway Master Mechanics. I know well the importance of the responsibilities of your calling. Having in your charge the safe and efficient working of a system which now binds the world in its iron embrace, I know from my own personal experience how it taxes brain and body to work this system well. It has, as you all know, no perfect working. Things unseen to any eye, beyond the reach of any supervision, but too frequently lead to instant destruction and to death; and in the main it is not fair to blame the management when such disasters occur. What a wonderful thing the railway is! What a wonderful thing the locomotive, so necessary for the world, and yet comparatively so new! There are those present here to-night who can remember with myself the opening of the Liverpool and Manchester Railway but a short forty years ago. Railways were then not new, but from the success achieved by the newly-designed locomotive on this line, a new era in the movements of men and material commenced. It may not be known to all here that the prospective motive power of the Liverpool and Manchester Railway was not finally decided upon until the road was well-nigh completed. The locomotive had its friends in Stephenson, Hawkshaw, Ericsson, and others. A plan for placing stationary engines at intervals along the line, to draw the trains by means of ropes and pulleys, had its supporters. Horses were looked to as a safe means to fall back upon when all else should fail; and a machine was even designed—and, I think, built—with a number of horses placed therein, turning in a circle, after the manner of the old horse-boats on the Delaware, ere steam took the lead in conveying people to Camden. But the first flash of the little Rocket, an engine of only four tons weight, changed all this, and the locomotive at once took the place which it now holds as the great motor on land. What a revolution this machine has wrought! How indispensable it has become in peace and in war! How faithfully it worked for us in the hour of our country's peril need not here be told. And now, when "grim-visaged War" shakes to their centres the two greatest powers of continental Europe, it is the locomotive that has enabled King William to throw his legions and his war material so swiftly over the frontiers of France, and thus by quick, redoubled blows, he has hurled his enemy back in defeat and dismay upon the capital, taking captive an emperor, and wrecking a dynasty which but two months since seemed firmly fixed upon a throne. But enough of war. I prefer more peaceful themes.

I happened to be in England in 1851, when the census of the kingdom was taken. To get at a true result, it was made compulsory on every householder to fill up a form, giving all the particulars of every individual who had slept under his roof on a certain night in the month of March. For further accuracy, it became necessary to know how many persons were out of bed and traveling on that night on the railways

of the kingdom. If my memory does not deceive me, the number of travelers reached to forty thousand—the population of a good-sized city. On our forty or fifty thousand miles of railway you can, in some sort, estimate the number of travelers who, at this very hour, are careering over our land. You can imagine, too, how many strained eyes are even now peering out into the darkness, as far as the head-light of the locomotive throws a gleam, eager to catch the first gleam of danger.

And here, my friends, let me say a word for the fearless men who manage our locomotives. Let them have the meed of honor they so justly deserve. Why, a man must be a hero who is willing to face the danger of running an engine forty miles an hour on a pitch-dark night. The safety of these brave and faithful men, and the safety of these thousands of weary travelers, is in a very great degree confided to the keeping of the railway master mechanic.

It is for him to see that the moving machinery of the road shall not betray its trust from any lack of care on the part of himself or his assistants. It is a fearful responsibility that rests upon him when it is considered that the lives of thousands of the traveling public depend upon the soundness and good condition of a wheel or an axle, a bolt or a coupling, or even the need of a few drops of oil. My fellow railway master mechanics, yours is a calling as indispensable as it is honorable; and it is well that you meet in annual convention as you meet now. It is well that you should thus come together, and be better known to each other, so that you can the more readily compare notes and devise better plans for the security of life and property; seeking, in all things, such a near approach to perfection in the working of our great railway system as will render accident and disaster almost impossible. This is your great mission. May you leave nothing undone that will hinder its fulfillment.

Master Mechanics' Convention.

THE Philadelphia *Press*, commenting on the harmonious and instructive sessions of this convention, says:

"As a deliberative body, its appearance was one in which all of us must take a hearty pride. In no other country could a similar body of men be assembled. When we watch the wild and tumultuous proceedings of the French National Assembly in its hour of peril, and hear the distracted and discordant cries of the popular gatherings, it is with more than pride—it is with thankfulness—that we can look upon such an assembly as the Master Machinists' Convention, and reflect that in their hands—a body of laboring men, but also of educated American workmen—the affairs and dignity of a nation would be in safer keeping than in any congress which French civilization has evolved."

Improved Car-Wheel.

A CORRESPONDENT of the *Iron Age* describes one as follows:

"The perfection of locomotive luxury will be undoubtedly reached when we can be transported easily and noiselessly over the road. The nearest approach to this yet attained is in a wheel lately invented, which is described as follows: The wheel is cast in three parts—the hub, the web, and a plate to which the hub is bolted. Between the axle and the hub is a ring of solid rubber, three inches wide and one inch thick. The effect of this arrangement is that a sudden blow on the web is communicated to the rubber, and hence to the axle. For this wheel it is claimed that it is cheaper, safer, because less liable to break, and more comfortable for the passenger. It reduces the jar to a minimum, and one can read without danger to the eyes while riding at the highest speed. In rounding curves the oscillation is scarcely noticeable. and the noise deadened, affording opportunity for conversation without the usual unpleasant effort."

Bearing-Surfaces in Machinery.

THE best form for journals and similar bearing-surfaces has been the subject of careful investigation by many mechanics and mathematicians, and a great deal has been published on the subject. But the quality of the material of which these surfaces should be formed and the best finish to be given to them has not been discussed by any writer that I have read, and yet it is a very important subject; for upon the perfection with which it is carried out depends greatly the durability of the work as well as the amount of power that will be wasted in driving the machinery. I have often seen machines that were a continual source of annoyance to their owners from their constant tendency to cut and heat when in motion, and I have known large amounts of money to be spent in the effort to remedy the evil, when the fact was that the difficulty lay in the character of the metal of which the bearings were made, and also in the methods used to finish the surfaces of these bearings.

It may be assumed as true that the harder and smoother any two surfaces are, the less will be the amount of friction between them. Watch-makers know that fine steel pivots, running in highly polished holes cut in the hardest jewels, give rise to the least amount of friction, and consequently such surfaces are always chosen for fine watches, as the disturbance of the motion is thus reduced to a minimum. An apparent exception to this is found in the case of the famous Babbitt-metal, which is comparatively soft. I do not attempt to offer any explanation of this apparent exception to the general rule—for an exception it certainly is. Morin, in his work on mechanics, under the head of friction, says that "if for the boxes of iron or cast-iron axles brass continues in use, it is chiefly because it is less hard, and wears out before the axles, and because it is easier to replace a box than an axle." At any rate, he found that, contrary to the general opinion, the friction of wrought-iron journals on cast-iron boxes was less than that of wrought-iron journals on brass boxes.

In selecting the material for forming bearings, whether these bearings are to be axles and boxes or plane sliding surfaces, such as those for planers, slotting-machines, etc., it is important that the material be hard and close-grained. Machinists make a great mistake when they allow a piece of open-grained cast-iron to be used for the bed or slides of a planer, for the boxes of a journal, or, in the case of heavy shafts, for the journal itself. All such open-grained surfaces will begin to cut sooner or later, and when once this action fairly sets in, it is almost impossible to stop it. Where wrought-iron is used, it is important that the fibres of the bar of which the shaft is made be thoroughly welded together. If they be left in a loose and fibrous condition, and the direction of the motion be at right angles to the direction in which the fibres run, it will be impossible to produce a smooth-running journal. In former times it was a very common thing to see machinists buy a lot of common round rolled iron, cut it up into suitable lengths, weld on collars, turn journals, and thus make what they were pleased to call a shaft or axle. In some cases, where the iron happened to be particularly good, these shafts did well enough, but in general they gave rise to an endless amount of trouble. One of the greatest benefits conferred upon machinists by the modern improvements in the manufacture of steel and iron is the introduction of a hard, non-fibrous material for journals. Common steel, good enough for all purposes except the making of fine edge-tools can now be had at a very moderate price, and wherever a journal is required to give the best satisfaction, it should be made of steel. In the case of large shafts, where the extra expense of steel would be more than could be afforded, it would be advisable to case with steel that part on which the journal is formed. The extra durability and the lessening of unnecessary friction would more than repay the slightly increased cost.

In finishing the surfaces of journals, boxes, and other parts exposed to sliding friction, great care ought to be taken to avoid the use of emery, especially in the finishing of soft metal, such as brass and cast-iron. As Babbitt-metal and tin are always cast and never tool-finished, any advice in regard to them would be superfluous. But I have seen a steam-engine cylinder made of soft and porous metal (cast-iron) carefully polished inside with emery, when the result must have been to cause a greatly increased wear of the piston. It is wonderful how readily the hard cutting grains of emery and similar polishing substances become imbedded in cast-iron, brass, and other soft materials, and then act just like the newly invented diamond drills. Every watch-maker knows that a copper wheel or disk smeared with diamond-dust will rapidly cut the hardest steel, and the action is the same in regard to all soft metal surfaces to which emery has been applied with considerable force, as in the ordinary process of polishing. Smoothness is an essential requisite in all surfaces that slide one upon the other, but this smoothness ought in all cases to be attained by cutting with sharp steel tools, and not by polishing with grinding substances.—*The Technologist.*

Postal-Cars.

THE Michigan Central management, who take the initiative in every thing that relates to substantial improvements in rolling stock, have authorized, through their master car-builder, J. B. Sutherland, of Detroit, the construction of several new and elegant cars, especially adapted to the wants of the postal service, the first of which made its appearance last Wednesday at the Central depot. This model coach possesses peculiar facilities for the uses for which it was designed, being in several important respects superior to any thing of the kind before attempted. A brief description (two others precisely similar having also been put on the line) will be of interest to our readers.

The car is 48 feet in length, solid and substantial in all its parts, neatly painted in buff color, with appropriate lettering. Two-thirds of the interior (finished in oak and black-walnut) is occupied with letter and paper cases, the former containing 450 boxes and the latter 60. These cases, with ample desks for "making up," are arranged in semi-circular form. Two cupola pendants, with patent reflecting lamps, hung on the cases, furnish a plentiful, clear, and soft light. The bulkheads are neatly grained, and the ceiling elaborately frescoed. Two velvet plush sofas, which can be stowed under the cases when not required, afford the tired clerks the chance of grateful rest. The balance of the car is used as a "through mail-room," where the bags are placed after the mails are distributed. To the doors is fastened the patent catcher, which snatches the mail-bags from cranes, to which they are adjusted, at the stations, as they pass at full speed, without causing delay to the train. The coach is mounted on a six-wheeled truck, is supplied with pure air by the Ruttan ventilator, and has the Miller platform coupler and buffer.

In the matter of comfort, convenience, and beauty, as well as strength, these cars are worthy of the inventive genius that planned, the skillful hands that built, and the model road that has first placed them on its line.

Two-Story Cars.

IN France, they are building two-story railroad cars. There is a great saving of first cost in them, and also in dead-weight. The latter amounts to only 200 pounds per passenger, while in this country the dead-weight per passenger is rarely less than 500 pounds, and often more. The new style would probably be of great advantage to roads that carry a large number of passengers for short distances, as on lines converging to the great cities, where there is a great population within five or ten miles that has to be transported to and from their business daily.

LINEN can be glazed by adding a tea-spoonful of salt and one of finely-scraped white soap to a pint of starch.

Snow-Plowing.

THE proverbial foresight and precaution of railway managers are already warning them of the approach of winter and of the preparations for the season of snow and ice, and in our perambulations through the world of railway inventions and improvements we have lighted upon a snow-plow which is destined to throw all other forms of that indispensable implement out of use. It is a separate vehicle to run in front of the locomotive, and armed with a plow of prodigious strength to clear away all snow and ice down to the level of the rails, and this is supplemented by scrapers for clearing the inside and outside edges of the rails down to the spike-heads and chairs. In addition to this, the sides of the car of the plow are furnished with wings that, by means of brakes inside the car, can be set at any required angle to the line of rails and will clear a passage five feet wide on each side of the track. The advantage of this ingenious arrangement is obvious; for, in the event of the plow striking any solid, immovable substance, the wings close automatically and are reopened by the plow-tender when the obstacle is past. The whole work of plowing is so thoroughly done that the shoveling and snow-pricking, generally necessary and always very expensive, is dispensed with—the track being left as clear as in summer. By the form and construction of this plow, it can be run at any speed, and no depth of snow can withstand its force. It is bound to go through. This machine is all the more valuable because it is calculated to do with a single engine the work which usually requires four or five. It was first designed by Superintendent C. L. Heywood, of the Fitchburg Railway, Boston, Mass., and has given perfect satisfaction on the Vermont and Massachusetts, the New-York and Flushing, and other roads that are greatly obstructed by heavy falls of snow.

THE New-York *Evening Post* says that a number of new Pullman palace-cars have just been put on the great northern mail route, (Alexandria, Lynchburg, Knoxville, Chattanooga, Grand Junction, Jackson to New-Orleans,) which run through without change between New-York and Lynchburg, Va. There are only two changes of cars on this road between New-York and New-Orleans, one at Lynchburg and the other at Chattanooga. The change at Lynchburg is necessary on account of a break in gauge, the Lynchburg and Alexandria line, like the northern roads, having the common 4 feet 8½ inch gauge, and the other lines southward having 5 feet gauge, which prevails in the South.

Car-Window Protector.

MR. W. M. K. THORNTON, of Rolla, Mo., has invented an attachment to be applied to the exterior of passenger coaches, before each window. It consists of a light rectangular brass frame, from six to eight inches wide and a trifle longer than the height of the car-window before which it is to stand. To three sides of this frame there is fastened a web of flannel, or other suitable material, gathered at the top and left free at the bottom so as to fill, and divert the current of air which the motion of the train produces. The inside of the frame is pivoted at a point a little above its centre, so that the top of the frame will always incline in the direction of the motion of the car, and this inclination is limited by a pin and slot. The cost of applying these protectors is quite small, while the additional comfort to passengers, in those seasons of the year when the windows are kept open, is considerable, since sufficient purified air finds its way through the meshes of the flannel to prevent suction and a too strong outward draught at the window. These additions need not in any way detract from the fine appearance of the exterior; indeed, when appropriate colors are used, the effect of thus hanging the banners on the outer walls will be rather picturesque than otherwise.—*Chicago R. R. Gazette.*

Iron Railroad Cars.

MR. E. GANJOT, a French engineer, writes as follows to *The Hub:* "Railroad cars with the main frame of iron have been in use in Europe over fifteen years. In 1859, I had charge of the car and railroad machinery department of the largest establishment of the kind in France; and in that year we received an order for 500 ten-ton coal-cars, with main and box frame of T, double T, N, and V iron, only the floor and side-boards being of wood. The design had been taken from the North-east Railroad Company of Switzerland, which had those cars in use for four years previous. The ten-ton coal-cars on the continent are similar in height and size to the coal-cars used in our coal regions, except in the running-gear. In 1862, I built some coal-cars for Prussia; and they were all iron, bottom and sides being made of heavy sheet-iron. In 1863, we received an order from the North-east Railroad of Switzerland for 250 coal-cars, 200 cattle-cars, and 10 baggage-cars, all of iron. The cattle, baggage, and passenger-cars used in Switzerland are of the same kind as those used in the United States, with same running-gear, and four and six-wheel trucks. I left Europe in 1864, but went back in 1867, at the time of the Paris Exposition, when I saw cars of all kinds and descriptions made wholly of iron. While on a tour to Switzerland I visited the offices of the North-east Railroad Company. They were much pleased with their iron cars, and have built over 2000 since that time. I saw some of the cars built by me, and they looked like new ones. The railroad official told me that they stand break and collision better than wooden cars, as all that gives way are the rivets and bolts, which can easily be replaced.

"I saw a great many passenger-cars made of iron in all parts except the inside work, such as seats, sashes, etc. I think in this country, where the collisions are so frequent, that iron cars would be of immense value. Some railroad men here say that the iron cars are not good, for the reason there have been so many break-downs with those which have been tried.

"My answer to their argument is that the iron coal-cars we have in use are not built right; the main frame is of wood, and the box is iron riveted together; while the box ought to be made in segments bolted together, so in case of breakage those segments could be taken apart and straightened."

Glass Passenger-Cars.

F. M. HORNING, of Corry, Pa., makes the following proposition in a letter to the *Scientific American:*

"Our railway coaches ought to be made with glass sides for several reasons. The peep-holes, so common now, ought to give place to windows 48 × 30 inches, consisting of panes of glass 15 × 48 inches, in sashes arranged to slide by one another. One such window to a seat, with curtains of some comparatively inexpensive material for summer, while something warm and heavy might be provided for winter, would be far better than the clumsy shutters in use, besides being more homelike and tasty. Such a coach would be lighter in both senses. What a grand view would be afforded to the traveler from such coaches! How imperfect the perspective now—how perfect then! Now we must be content to gaze on panel, veneer, and daub; then we might gaze with unobstructed vision on all the light and beauty with which the Father has adorned this fair land of ours. All of the exhilarating effect of buggy-riding is lost in these cages—cages, yes, cages of death in so many catastrophes.

"With the sides of glass, few would be left in the wreck when it reached the bottom of some declivity, to scorch and burn as at Angola.

"With the sides of glass, many would have escaped who sank beneath the surface of a river, to rise only in death, in cars transformed as quickly into capacious coffins.

"With the sides of glass, how easily the elbows or the foot might open an avenue of escape in every case of danger. Many firemen and engineers have escaped death by jumping from their cabs, when to remain would have been a useless sacrifice of life."

Communications.

Hot Boxes.

EDITOR OF THE NATIONAL CAR-BUILDER: I notice in your October number a communication on the subject of hot boxes, in which the writer tells how they are produced and how they can be prevented. His experience as regards his method of prevention must have been peculiar, and does not accord with my own. I know of a road that has recently had a large number of cars built, and for the purpose of avoiding hot boxes, the plan recommended by your correspondent was adopted—that is, the boxes were placed close to the hub of the wheel, and the result has been a great deal of trouble caused by the additional friction made by the rubbing of the cast-iron box against the hub. If trucks were built and boxes made with a lateral motion of the axle, which your correspondent assumes to be an inch or more in moving in and out of the box, the dirt might be carried in and the oil forced out; but I deny that any more dirt will get into the box with an inch or more play between it and the hub than with a quarter of an inch play. Such, at least, has been my experience; I have tried both ways, and have found more trouble from friction—which I suppose is the cause of hot boxes—where the box was close to the hub of the wheel, grinding and crowding all the dirt that gathers round the back of the box into it, and wearing the back of the oil-box off so in some cases the packing would come out. On the other hand, if a space of from one and a half to two inches were left between the hub and box, the dirt, instead of being carried into the box to the extent the writer seems to suppose, would in a great measure fall away.

I apprehend that the real causes of the heating of boxes on our railways are not, as a general rule, what your correspondent supposes. On all old roads the origin of the trouble is in the construction of the truck, the result doubtless of inexperience on the part of the builder. This class of trucks being on the road, must be used until worn out or superseded by others that are better. One cause of heating is owing to the fact that the bearings are too short for the heavy cars now placed upon them. Another is, that the weight is not brought to bear upon the brasses in the centre of the bearing, but in many cases upon one end, making the pressure unequal; or, in other words, the friction is concentrated upon a comparatively small surface with increased liability to produce heating. Another imperfection is in the fitting up of the oil-boxes and brasses, and sometimes in the variation of the length of axles. The width of the truck-frame is also an important consideration. On the road I am now connected with, our old trucks vary in width nearly an inch, which requires, of course, a margin of space sufficient to get the truck-frames on the boxes. To remedy the difficulty as far as possible, I at once made a new box-pattern, and fixed a uniform width, requiring all to be made of that width, and now we are having no trouble with these trucks, notwithstanding the oil-box does not touch the hub of the wheel.

I would mention one more cause of hot boxes, which is cheap oil, or rather oil with little or no lubricating qualities. Some of these oils are so inflammable that if a box is warm, the more you put on the worse it is, unless you stop and completely cool and repack it. In conclusion, I would say in regard to this chronic trouble with railway rolling stock, fit up the boxes as they should be; place the weight of the car directly on the centre, so as to give equal and uniform bearing on the brasses; make the truck the exact width, so as to avoid binding on the collars of the axle, with as little lateral motion as is possible, say not over an eighth of an inch, and use good oil, and I will warrant a car to run not less than ten thousand miles with one oiling.

AXLE.

Car-Springs.

EDITOR OF THE NATIONAL CAR-BUILDER: When an individual mounts the rostrum he is always presumed to have something to say, and to possess some knowledge of the subject in hand. A theoretical knowledge is valuable in many branches of business, but in mechanics it must be practical in order to acquire the experience necessary to enable the mind to comprehend with accuracy and precision the details of any special branch. Being eminently practical myself, and having been for a number of years engaged in the construction of railway-cars, and familiar with the operation of rolling stock, I presume I may claim, without being considered egotistical, some acquaintance with the details of this department of mechanical industry. It is not my purpose, however, at this time, to discuss points relative to the construction of cars generally, but merely to allude to the particular feature of springs, which is next in importance to wheels and axles. The quality of both buffer and bearing springs is a matter of vital importance, as it affects the economical operation of our roads much more than some of our railroad managers seem to suppose. Much valuable property is saved by having cars properly equipped with suitable springs, and it seems to me to be false economy to use an inferior article to save expense, when a few dollars more would procure a good one that would repay ten times over the additional cost, in the way of longer service both in rolling stock and roadway. The inquiry is next suggested as to what constitutes a desirable spring, and what materials should enter into its construction? The essential qualities are doubtless elasticity and durability. The spring being, in its practical use, interposed as a medium between two movable bodies that are likely to come into forcible contact, it acts as a cushion to receive and break the force of the collision without injury to either. Hence it is highly important that the medium should be of such a nature as to be affected by either a light or heavy force brought to bear upon it. The materials best suited to this purpose, we have no hesitation in saying, are steel and India-rubber, either separately or in combination. I am inclined to think, however, that the required results are obtained the most completely by their combination. The best method of arranging this combination may not yet have been discovered; but the nearest approach that has yet been made to a perfect spring is exhibited in what is called the *Rubber Centre Spiral*, in which the two materials of rubber and steel are so combined that each acts with perfect freedom, and both are so controlled as to produce in their joint action the required result. One important feature of this device is the precision with which the elasticity can be adjusted and made available to the service required. B.

Mobile and Ohio Car-Trucks.

EDITOR OF THE NATIONAL CAR-BUILDER: I notice an article in the October number of your paper giving a description of what are claimed to be improvements in the construction of car-trucks, introduced by Major L. J. Fleming, of the Mobile and Ohio Railroad. One of these improvements is spoken of as a new device, and is said to consist in placing the brakes between the wheels. It seems to me that if the writer of the article referred to was at all familiar with the building of trucks, or had ever been far from home, he would not have claimed this as any thing new in the arrangement of brakes. I used them in this way years ago, and the style of trucks on the New-York Central Railroad have the brakes attached in the same way. The writer speaks of placing the springs which sustain the car upon two equalizing-bars instead of one. This I do not understand, and should like to have explained. He does not say whether the truck has six wheels or four. Of course, two equalizing-bars are used in six-wheel trucks, but how they are lowered so as to bring the body of the car a foot lower than it is usually hung, is what I can not understand. If thirty-three-inch wheels are used, the body of the car, it seems to me, can not be placed a foot lower without losing the use of the springs. A little additional explanation would perhaps make the matter clearer. The swing-beam, or lateral motion, the writer speaks of, is so old that the patent expired years ago. He also mentions that Major Fleming is also introducing a decided improvement in the coupling and draw-bar of freight-cars, a more detailed and particular description of which would be very acceptable to car-builders, and I trust it will in due time be forthcoming. X.

Personal.

MR. J. D. HERKIMER has resigned his position as superintendent of the Indianapolis and St. Louis Railroad, and Mr. A. A. Tallman has been appointed as his successor.

COLONEL C. G. HAMMOND, General Superintendent of the Union Pacific Railroad, has retired from that position, and Mr. T. E. Sickles, heretofore chief engineer of the same road, has been appointed to succeed him.

THE annual convention of the Conductors' Life Insurance Company commenced its session in Philadelphia last Wednesday. Mr. J. M. Seymour, of the Illinois Central Railroad, delivered the annual address. There was a large attendance of representatives from most of the railroads in the United States.

IT is stated that Vice-President Colfax has connected himself with a company organized for the purpose of engaging in the manufacture of steel axles at South-Bend. The business will be conducted upon a large scale, giving employment to at least four hundred men.

MR. GEORGE M. PULLMAN, of palace-car fame, is erecting a handsome residence in Chicago. The style will be French Renaissance, and the material brown sandstone, from the quarries of Portland, Conn. The exterior on all sides will be of sandstone, and no brick will be visible anywhere. Handsome pillars will adorn the front, and over the main entrance be a *porte cochere*. The windows will be of plate glass, thirteen feet high by six feet wide. Inside every thing will be fitted up as handsomely and as neatly as wealth, guided by taste and judgment, shall dictate. Besides parlors, bedrooms, kitchens, and other apartments, there will be a billiard-room and bowling-alley. The cost of the residence will be somewhere in the vicinity of $100,000.

THOMAS EWBANK, mechanic, author of *Ewbank's Hydraulics and Mechanics*, and ex-commissioner of patents, died in this city on September 16th, at the advanced age of 79 years. He had been for some years in feeble health, and his death was not unexpected.

MR. SEDGELEY, lately general master mechanic of the Michigan Southern Division of the Lake Shore and Michigan Southern railway, has been appointed general master mechanic of the company, in charge of the entire line.

MR. JOHN KIRBY, master of car repairs on the Michigan Southern Division, has been appointed to take charge of that department over the entire line of the Lake Shore road.

MEMBERS of the Railway Master Mechanics' Association are requested to send their address at once to the secretary, L. P. Dodge, 53 Dearborn street, Chicago, that all may be supplied with the annual report, which will soon be ready for distribution.

A WISCONSIN paper mentions a case where burglars broke into a store, but the goods were marked so high that they would not take any away.

Publishers' Notices.

The Chicago Railroad Gazette, as a medium of intelligence for railroad men, is one of the most valuable publications in the country, containing a great variety of original and well-selected articles upon subjects pertaining to the construction, management, and operation of railways, as well as a voluminous record of current railroad news. Its writers have information and experience, and a thorough acquaintance with the wants of the railroad community. Its editorial corps has recently been reinforced by Mr. M. N. Forney, whose ability and experience in mechanical engineering will prove a valuable acquisition to this department of the paper.

The Hub announces that its publishers, Messrs. Valentine & Company, have purchased the *New-York Coach-Maker's Magazine*, and, with Mr. Clemins Petersen as associate editor, will assume the editorial management of the same in its November number.

The Cabinet-Maker, a weekly quarto published by J. Henry Symonds, Boston, and devoted to the interests of the furniture trade, contains a choice variety of original and selected matter, interesting alike to the general reader and the trade. It is one of the most welcome of our exchanges, and is deserving of a wide circulation.

The American Engineer is a weekly quarto journal published in Philadelphia by McCalla & Stavely, and devoted to the interests of inventors, mechanics, and manufacturers. It is well printed, and contains an interesting variety of reading matter, with engravings illustrative of machinery and inventions.

The Iron World and Manufacturer is the title of a large weekly journal published in Pittsburg, and specially devoted to the interests of metal manufacturers, workers, and dealers. It contains a variety of interesting matter, original and selected, reliable reports of the markets, domestic and foreign, and illustrations of machinery and novelties in iron and other metals, making it a valuable medium to all who are engaged in this branch of industry. We invite attention to its advertisement in another column.

WE call the attention of our readers to the advertisement of the *Missouri Valley Life Insurance Company*, on another page. This company has complied with the laws of twelve States, and will shortly open an office in New-York. The great feature of this company is its ability to loan its money at a high rate of interest, and consequently to pay large dividends. Explanatory documents will be furnished by the company on application.

IN our advertising columns will be found a cut with explanatory references illustrating a patent bale-fastener, devised by Mr. James W. Evans, of this city. It is designed as a substitute for rope in baling cotton. The device is simple, cheap, and effective, and is worthy of the attention of planters in the cotton-growing States.

HARLAN, HOLLINGSWORTH & CO., Wilmington, Del., have just completed an addition to their car-shops, consisting of a building 117 feet in length and two stories high. They are building six elegant passenger sleeping-coaches for the Pullman Car Company, and have also in progress passenger-coaches of various kinds for four different roads. The car department is under the direction of Mr. T. W. Bowers.

THE Lehigh and Susquehanna Railroad have 10,700 cars now running, which are all their single track will accommodate. A double track will be necessary to do their work.

CEMENT for stopping sand-holes in iron castings is made by mixing one part of flowers of sulphur and two parts of sal-ammoniac with eighty parts of coarsely-powdered iron-turnings. Sufficient water is used to make this compound into a thick paste; it is used as soon as it is made, and the holes are plugged tight with it. This cement ultimately becomes as hard as the metal itself.

Delaware Car-Works.

THESE works of the Jackson & Sharp Company are located at Wilmington, Del., on the line of the Philadelphia, Wilmington, and Baltimore Railroad, between Christiana and Brandywine rivers. Their facilities for receiving the raw material and delivering the manufactured article are unsurpassed. For the convenience of the ship-building branch of their business, they have an extensive water frontage, with a depth of water sufficient for the largest coasting steamers. The erecting and paint-shops of the car department are 70 feet in width, and 200 and 400 feet in length. Besides these, there are also an extensive sash-shop, a smith-shop, machine-shop, etc. The company employs over 500 operatives, and the weekly pay-roll amounts to $6000. The capacity of the works is such, that some forty first-class passenger-cars are in process of construction at the same time, including at present several of the famous Pullman palace-cars. The company have recently placed two of these cars on the Baltimore and Ohio Railroad. The cars made at these works are shipped to every part of the country, and are justly celebrated for their substantial workmanship, the excellent taste displayed in their ornamentation and furniture, as well as for all progressive improvements calculated to increase the comfort of the traveling public. We invite the attention of railway managers to their advertisement on another page.

THE Paterson *Press* says: "The reconstruction of the Rogers Locomotive and Machine Works will not be carried any further this year. The immense new mill, lately erected, is gradually getting into operation, and in a few months will probably be in use. It is driven by one of the finest overshot wheels in the city —an 80 horse-power affair. The next rebuilding, it is thought, will be at the corner of Market and Spruce streets, but that will not be started before next spring."

THE projected union passenger station at Albany will shortly be commenced. The plans show it to be the largest passenger depot in the United States. It will be located in the rear of the Delavan House, and is designed for the use of the Boston & Albany, Hudson River, Harlem, Albany & Susquehanna, New-York Central, and Saratoga Railroads.

THE Tredegar Works, at Richmond, Va., in addition to their other great enterprises, have undertaken the business of freight-car building, and they are now sending these cars South at the rate of three per day. This new industry, so successfully introduced by this company, now gives employment and support, directly and indirectly, to over five hundred persons."

THE Indianapolis Car-Wheel Works of Mercer, Nash & Co. are completed, and are to go into operation at once, and then to melt fifteen tons per day, and employ about thirty men.

THE PULLMAN PALACE-CAR COMPANY, organized in 1867 with a capital of $1,000,000, has now increased it to $8,000,000. It runs its cars over fifteen thousand miles of railroads, and employs about three thousand men.

IN 1828, there were *three* miles of railway in the United States, and now we have 48,860 miles, and the increase can not be less than thirty miles a day.

IRON may be effectually prevented from rusting by coating it with asphalt varnish, then baking it in an oven; but such an application can not conveniently be made to the iron-plates of ships, and such large masses of iron. Red lead is a good paint for iron, but it requires to be applied with care in order to render it durable. The first coat should be put on thin, then allowed to dry, and the iron should then receive two subsequent coats

Revenue Stamps.

FROM and after October 1st, no stamps are required on any receipts for money, whether for a large or small amount. All sight-checks drawn on any bank, banker, or trust company, whatever the amount, will require a two-cent stamp as heretofore; all sight-checks or money-orders drawn on any private individual, or company, or corporation, not in the banking business, will also require a two-cent stamp, if the amount exceeds ten dollars. All notes of hand, and due bills of every description, for a less sum than one hundred dollars will require no stamp. All promissory notes amounting to $100 and over are to be stamped as heretofore. And all mortgages transferred, sold, or assigned after October 1st, will require no new stamp if the original has been once duly stamped when it was executed. All taxes on sales, except such as are now paid by stamps, and except the tax on sales of tobacco, snuff, cigars, spirits, and wines, will now cease The returns for September are the last to be required under the law as it stands. Licenses and special taxes assessed by the year will run to May 1st, except the tax on brewers and dealers in distilled spirits and tobacco.

Henry Ward Beecher on Interest.

No blister draws sharper than the interest does. Of all industries none is comparable to that of interest. It works all day and night, in fair weather and foul. It has no sound in its footsteps, but travels fast. It gnaws at a man's substance with invisible teeth. It binds industry with its film, as a fly is bound in a spider's web. Debts roll a man over and over, binding hand and foot, and letting him hang upon the fatal mesh until the long-legged interest devours him. There is but one thing on a farm like it, and that is the Canada thistle, which swarms new plants every time you break its roots, whose blossoms are prolific, and every flower the father of a million seeds. Every leaf is an awl, every branch a spear, and every plant like a platoon of bayonets, and a field of them like an armed host. The whole plant is a torment and vegetable curse, and yet a farmer had better make his bed of Canada thistles than attempt to be at ease upon interest.

A Valuable Wood.

THERE is a branch of the Trinity River in Texas called the Bois d'Arc, the bottom-lands of which for about a mile on each side and for fifty miles in length are covered with a forest of peculiar trees known as "bois d'arc," (bow-wood.) From the description of the wood of this tree given in a newspaper of that country, the Kaufman *Star*, it seems probable that it would be an excellent substitute for teak in the Mansell car-wheels, and probably valuable elsewhere in car-building. This description is as follows: "We will venture the assertion that no living man ever saw the symptom of decay in this remarkable timber. The running gear of a wagon that has been in constant use over twenty years is before us as we write this article, and yet the wood-works are, to all appearance, as sound as when turned out of the shop. There is an oil in the wood which fills up the pores and prevents either air or water from affecting it. No one can tell how long it will last even when exposed to the weather. A reward may be offered in vain for a decayed particle of this timber. It is not affected by the rays of the sun, and hence it never shrinks. A carriage-wheel made of bois d'arc will run until the tire is worn out without having to set it. But the greatest evidence of the superior quality of this wood for wagons and carriages may be estimated from the fact that a rough home-made bois d'arc wagon is worth about double the best Northern-made wagon."

WE invite the attention of railway managers to the advertisement on another page, of Batcheldor's Patent Track-Lifter, a decided improvement on present methods.

Facetiæ.

AT some place out West, where the commissariat appears to be imperfectly organized, a youth was seen furiously scratching at the side of a gravelly hill.

"What are you after, my friend?" inquired a passer-by.

"After a ground-hog I saw run in this hole."

"Why, you don't expect to get him in that way?"

"Git him! *Bound* to git him! *We're out of meat!*"

"MISTER CROW, what am your 'pinion of Sam Toby's character for honesty?" "Wal, as for Sam, I don't know nothing about him. Some says he's honest, and it may be so. I don't say he an't honest. But this I does say: if I war a chicken, and Sam was about the yard, dis niggah would *roost high*, he would."

A CAPTAIN, one of the old school, being at a ball, had been accepted by a beautiful partner, a lady of rank, who, in the most delicate manner possible, hinted to him the propriety of putting on a pair of gloves. "Oh!" was the elegant reply; "never mind me, ma'am; I shall wash my hands when I've done dancing."

"LOOK here, Pete," said a knowing darkey to his companion, "don't stan' on the railroad." "Why, Joe?" "Kase, ef de cars see dat mouf of yourn, dey will tink it am the depo' and run rite in!"

"ARE you not alarmed at the approach of the King of Terrors?" said a minister to a sick man. "Oh! no; I have been living six-and-thirty years with the queen of terrors—the king can not be much worse!"

ONE of the newly-rich of Boston, having, after a long struggle, worked himself into good society by means of the aristocratic alliance of his daughter, gave a grand dinner-party to his newly-acquired circle. He didn't invite his own brother, for the reason that "society is getting so mixed one must draw a line somewhere."

TWO San Francisco barbers engaged to fight a duel, agreed to part and walk around a block, and when they got in sight of each other to blaze away. When they turned the corner out of sight, both started on a run in different directions, and one has sent back from Alaska for his winter clothes, and the other has written to his wife from the City of Mexico, asking her to send his linen hat and palm-leaf coat.

AN East-Tennessee woman waved a red flag till a train stopped, and then asked the conductor if her sister was aboard.

AN Indiana man was bitten by a rattlesnake about twenty years ago, and he still keeps taking whisky to cure the bite.

A MAN in Wayne County, Miss., is feeding his cow on juniper-berries in hopes to get her to give gin and milk.

I DON'T see but one reason why that mare can't trot her mile in three minutes—the distance is too great for the time.

THE California Chinese are making progress in civilization. Two of them fought a duel the other day.

WHAT is the greatest curiosity in the world? A woman's.

Locomotive Builders.

Baldwin Locomotive Works	Philadelphia, Pa.
Brooks Locomotive Works	Dunkirk, N. Y.
Danforth & Cooke	Paterson, N. J.
Grant Locomotive Works	" "
Hinckley & Williams	Boston, Mass.
Manchester Locomotive Works	Manchester, N. H.
Mason, William	Taunton, Mass.
McKay Iron and Locomotive Works	Jersey City, N. J.
Portland Company	Portland, Me.
Pittsburg Locomotive Works	Pittsburg, Pa.
Rogers Locomotive Works	Paterson, N. J.
Rhode Island Locomotive Works	Providence, R. I.
Schenectady Locomotive Works	Schenectady, N. Y.
Smith & Porter	Pittsburg, Pa
Taunton Locomotive Works	Taunton, Mass.

DIRECTORY

OF

MASTER MECHANICS AND MASTER CAR-BUILDERS

THROUGHOUT THE UNITED STATES AND CANADA.

Railroad.	*Master Mechanic.*	*Master Car-Builder.*	*Residence.*
A			
Albany & Susquehanna	R. C. Blackall	R. C. Blackall	Albany, N. Y.
Atlantic & Great Western		N. H. Marsh	Kent, Ohio.
Atlantic & Gulf	C. Collins	J. Sullivan	Savannah, Ga.
Alexandria & Fredericksburg			Alexandria, Va.
Alabama & Chattanooga	H. M. Smith	H. M. Smith	Chattanooga, Tenn.
Atlantic & North-Carolina	E J. Clayton	E. J. Clayton	New-Berne, N. C.
Atlanta & West-Point	Wm. Rushton		Atlanta, Ga.
Atlanta & West-Point	R. D. Cole		Newnan, Ga.
Atlantic & Pacific			Boston, Mass.
Allegheny Valley	G. W. Glass	R. Gunning	Pittsburg, Pa.
Androscoggin	Ira K. Russell	C. S. Greenwood	Farmington, Maine.
Adirondack			Saratoga, N. Y.
Alexandria, Loudon & Hampshire	Nathaniel Hayes	Nathaniel Hayes	Alexandria, Va.
B			
Bay de Noquet & Marquette	John J. Murphy	H. D. Lyons	Marquette, Mich.
Bangor, Old Town & Milford	J. B. Peckham	John H. Brown	Bangor, Maine.
Bennington & Rutland	John Haining		Rutland, Vt.
Baltimore & Ohio	John C. Davis	John C. Davis	Baltimore, Md.
Bellefonte & Snow Shoe	H. D. Landis	H. D. Landis	Bellefonte, Pa.
Belvidere Delaware	R. McDowell	John Silvers	Lambertville, N. J.
Boston & Albany	Wilson Eddy	F. D. Adams	Springfield, Mass.
Boston & Albany	A. B. Underhill	W.E.Chamberlain	Boston, Mass.
Boston & Providence	George S. Griggs	John Lightner	Roxbury, Mass.
Boston, Clinton & Fitchburg	John Webster	Samuel Stevens	Fitchburg, Mass.
Boston, Concord & Montreal	R. Adams	M. R. Elkins	Lake Village, N. H.
Boston & Maine	N. G. Paul		Boston, Mass.
Boston & Maine		D. C. Richardson	Lawrence, Mass.
Boston & Lowell & W. L	L. R. Winslow	S. A. Davis	Boston, Mass.
Blossburg & Corning	O. C. Patchell	O. C. Patchell	Corning, N. Y.
Brockville & Ottawa	Joseph Cockfield	Joseph Cockfield	Brockville, Can.
Blue Ridge			Anderson, S. C.
Burlington & Missouri River	G. Chalender.	G. Chalender.	Burlington, Iowa.
Burlington, Cedar Rapids & Minn			Cedar Rapids, Iowa.
Buffalo & Erie (see Lake Shore)	William Hart	J. N. Mileham	Buffalo, N. Y.
Buffalo & Washington			Buffalo, N. Y.
Boston, Hartford & Erie	D. Thomas	Elias Pratt	Boston, Mass.
Buffalo, Corry & Pittsburg	Thomas Connell	Thomas Connell	Corry, Pa.
Buff. Bayou, Brazos, Colorado	E. Perry	M. Borst	Harrisburg, Tex.
C			
California & Pacific	O. R. Ford	D. Rutherford	Vallejo, Cal.
Camden & Amboy	F. B. Stevens T. T. Kerr Thomas Single	E. Lockwood	Hoboken. Bordentown, N. J. South-Amboy.
Camden & Atlantic	E. Collings	S. Wills	Camden, N. J.
Catawissa	A. J. Prescott	G. P. Trustermacher	Catawissa, Pa.
Cape Cod	E. A. Walker	William Cannon	Hyannis, Mass.
Calais & Baring	Chas. W. Butler	Chas. W. Butler	Milltown, Me.
Cascade	E. Copley	James Smith	Cascades, W. T.
Catasauqua & Fogelsville	Thomas Evans	Chas. S. Holbach	Catasauqua, Pa.
Carrolton & Oneida	M. T. Wiggins		Carrolton, Ohio.
Charleston & Savannah	H. T. Calder		Charleston, S. C.
Chesapeake & Ohio	W. G. Freeman	J. N. King	Richmond, Va.
Cheraw & Darlington			Cheraw, S. C.
Champlain Trans. Co	H. T. Calder		Burlington, Vt.
Cheshire	F. A. Perry	F. A. Perry	Keene, N. H.
Charlotte & South-Carolina	T. D. Kline	W. T. Brown	Columbia, S. C.
Chicago & North-western	Horatio Anderson		Chicago, Ill.
Chicago & North-western		Thomas Hull	Chicago, Ill.
Wiscon. Mad. & Mill. Divis		Henry Hull	Fond du Lac, Wis.
Galena Division	R. W. Bushnell	Hugh Gray	Chicago, Ill.
Chicago & N. W. Iowa Division	C. C. Elliott	William Campbell	Clinton, Iowa.
Chicago & N. W. Peninsula Division	S. L Pierce		Escanaba.
Chicago & Alton	John A. Jackman	R. Reniff	Bloomington, Ill.
Chicago, Burlington & Quincy	C. F. Jauriet	W. W. Wilcox	Aurora, Ill.
Chicago, Cincinnati & Louisville	C. F. Kidder	D. B. Howe	La Porte, Ind.
Chicago, Rock Island & Pacific	T. B. Twombly	J. I. Fogg	Chicago, Ill.
Cleveland, Col., Cin., & Indianapolis	W. F. Smith	William Cleve	Cleveland, Ohio.
Cleveland and Pittsburg	N. E. Chapman	N. E. Chapman	Cleveland, Ohio.
Cleveland, Zanesville & Cincinnati	J. W. Holloway	J. W. Holloway	Akron, Ohio.
Cincinnati, Hamilton & Dayton	William Cullen	W. H. Allison	Cincinnati, Ohio.
Cincinnati & Zanesville	Peter Green	D. J. Jewell	Lancaster, Ohio.
Cincinnati & Indianapolis Junction	O. H. P. Little	W. W. Degnacey	Cambridge, Ind.
Cincinnati, Sandusky & Cleveland	Wm. Swanston	William Earick	Sandusky, Ohio.
Concord	E. Studley	M. W. Dickerman	Concord, N. H.
Concord & Claremont	J. N. Lander	A. Langmaid	Concord, N. H.
Council Bluffs & St. Joseph	Myron Ellis		Council Bluffs, Iowa.
Connecticut River	John Mulligan	J. Hitchcock	Springfield, Mass.
Contoocook River			Concord, N. H.
Conn. & Passumpsic Rivers	Horace Alden	Horace Alden	Lyndon, Vt.
Cumberland Valley	A. S. Hull	C. W. Nitterhouse	Chambersburg, Pa.
Cumberland & Pennsylvania	W. L. Jordan	N. Binnix	Mt. Savage, Md.
Central of Georgia	B. L. Boulineau	C. C. Millar	Savannah, Ga.
Central of New-Jersey	†T. W. Peeples	George Hackett	Elizabethport, N. J.
Central Branch Union Pacific	Wm. D. Rowley	W. A. Grubb	Atchison, Kansas.
Central R. R. of Iowa	H. P. Vedder	H. P. Vedder	Elden, Iowa.
Central Pacific	E. T. Perkins	E. T. Perkins	Sacramento, Cal.
D			
Dayton & Union	A. J. Keenan	J. F. Feicht	Dayton, Ohio.
Danbury & Norwalk	Charles A. Craig	Wm. W. Bedient	Danbury, Ct.
Dayton & Michigan	William Cullen,	W. H. Allison	Cincinnatti, Ohio.
Delaware, Lackawanna & Western	William Dawson	A. Overbagh	Scranton, Pa.
Des Moines Valley	Morris Sellers	R. E. Smith	Keokuk, Iowa.
Detroit & Milwaukee	B. Briscoe	B. Briscoe	Detroit, Mich.
Delaware & Hudson Canal Co	James Dickson	Thomas Orchard	Carbondale, Pa.
Dorchester & Delaware			Cambridge, Md.
Dubuque South-western	J. M. Williamson	J. M. Williamson	Farley, Iowa.
Dutchess & Columbia			Washington, N. Y.
E			
Eastern		J. P. Somerby	Salem, Mass.
Eastern	John Thompson		East-Boston, Mass.
East-Tennessee & Virginia	Jos. Armbruster	Jos. Armbruster	Knoxville, Tenn.
East-Tennessee & Georgia	Eli Hixon		Knoxville, Tenn.
East-Pennsylvania	J. M. Geary	Samuel Reeves	Reading, Pa.
Erie Railway	*E. O. Hill		Susquehanna, N. Y.
Erie Railway	H. L. Brown	C. A. Smith	Jersey City, N. J.
Erie Railway	M. E. Brown	M. Wilder	Buffalo, N. Y.
Erie Railway	W. E. Cooper	W. E. Cooper	Dunkirk, N. Y.
Erie Railway		W. E. Rutter	Elmira, N. Y.
Evansville & Crawfordsville	John L. White	A. Sharra (fore'n)	Evansville, Ind.
Evansville, Henderson & Nashville	W. H. McCafferty.	W. H. McCafferty.	Nashville. Tenn.
European & North Am. (of Maine)	A. O. Bailey	J. H. Brown	Oldtown, Maine.
Erie & Pittsburg	John Young	John Young	Erie, Pa.
Eldora			Dubuque, Iowa.
F			
Florida	J. G. Chalk	G. Hernandez	Tallahassee, Fla.
Flint & Pere Marquette	Sanford Keeler	Sanford Keeler	East-Saginaw, Mich.
Fitchburg	Geo. A. Cooledge	Enos Varney	Charlestown, Mass.
Fitchburg & Worcester			Fitchburg, Mass.
G			
Grand Trunk	*Richard Eaton	J. W. W. McWood.	Montreal, Canada.
Galveston, Houston & Henderson	William McBeth	E. J. Sherman	Galveston, Texas.
Grand River Valley		James Potts	Jackson, Michigan.
Grand Rapids & Indiana			Fort Wayne, Ind.
Great Western of Canada	*Wm. A. Robinson		Hamilton, Canada.
Georgia	William Hardman.	Samuel Frost	Augusta, Ga.
Greenville & Columbia		J. O. Meredith	Helena, S. C.
H			
Hanover Branch	John J. Bingley	Henry Britcher	Hanover, Pa.
Hartford & New-Haven	N. Slingstand	F. Leppense	Hartford, Ct.
Hannibal & St. Joseph	H. A. Towne.	H. C. Whiting	Hannibal, Mo.
Hartford, Providence & Fishkill	Edwin Garfield	V. D. Perry	Hartford, Ct.
Hackensack & New-York	Abra'm Angausen		Hackensack, N. J.
Hastings & Dakota	C. C. Clements		Hastings, Minn.
Housatonic	C. R. Morris	J. Ferris	Bridgeport, Ct.
Houston & Texas Central	Reuben B. Snyder	J. F. Rice	Houston, Texas.
Houston Tap & Brazoria	A. Malsch	R. H. Yeomans	Houston, Texas.
Huntington & Broad-Top Mountain	D. G. Gilchrist	M. Tellerhoof	Saxton. Pa.
Hempfield			Washington, Pa.
Hudson River	Wm. Buchanan	Wm. S. Town	New-York.
Hudson River	John Dykeman	Charles D. Mills	East-Albany, N. Y.
I			
Indianapolis, Cincinnati & Lafayette	H. M. Britton	H. M. Britton	Cincinnati, Ohio.
Indianapolis, Peru & Chicago	John McKenna	John McKenna	Peru, Ind.
Illinois Central	S. Hayes.	C. Scoville	Chicago, Ill,
Iowa & Missouri State Line			Farmington, Iowa.
Iron	Perry Scott	Clem. Roetling	Ironton, Ohio.
Indianapolis & St Louis	C. E. Benton	C. E. Benton	Litchfield, Ill.
J			
Jeffersonville, Madison & Indiana	Reuben Wells	John Higgins	Jeffersonville, Ind.
Jackson, Lansing & Saginaw	Andrew Wilson	A. Wilson.	Jackson, Michigan.
K			
Keokuk & St. Paul	P. R. Sutton	Wm. McElroy	Keokuk, Iowa.
Knox & Lincoln			Bath, Maine.
Kentucky Central	J. R. Ledyard	J. L. Hackenthorn	Covington, Ky.
Knoxville & Charleston			Knoxville, Tenn.
Kansas Pacific	Geo. W. Cushing.	Geo. W. Cushing	Wyandotte, Kansas.
Kalamazoo, Allagan & Grand Rapids			Kalamazoo, Mich.
Kansas City, St. Joseph & Council Bluff.	H. L. Cooper		St. Joseph, Mo.
L			
Lake Erie & Louisville	John Pero		Fremont, Ohio.
Lackawanna & Bloomsburg	Chas. Graham		Kingston, Pa.
Lehigh Valley	J. Kinsey.		South-Easton, P a.
Lehigh Valley	P. Hofecker	E. R. Brown	Weatherly, Pa.
Lehigh Valley	A. Mitchell	Mauch Chunk, Pa.	Delano, Pa.
Lehigh Valley	D. Clark		Hazelton, Pa.
Lehigh & Susquehanna	L. C. Brastow	L. C. Brastow	Wilkesbarre. Pa.
Lehigh & Susquehanna	Wm. H. Brown		Mauch Chunk, Pa.
Leavenworth, Lawrence & Gal	S. Philbrick.		Lawrence, Kansas.
Lewy's Island	C. W. Button	Damase Merceir	Milltown, Maine.
Little Rock & Fort Smith			Little Rock, Ark.
Lebanon Springs			Burlington, Vt.
Little Miami, Col. & Xenia	J. H. Setchel	M. P. Ford	Cincinnati, Ohio.
London & Port Stanley			London, C. W.
Louisville, New-Albany & Chicago	Jacob Losey	Jacob Losey	New-Albany, Ind.
Long Island	Chs. A. Thompson.	E. A. Olmstead	Hunter's Point, L.I.
Louisville, Cincinnati & Lexington	John Skidmore	Theo. G. Shaw	Louisville, Ky.
Louisville & Nashville	Thatcher Perkins	Isaac M. Owens	Louisville, Ky.
Lake Shore & Michigan Southern	†James Sedgley		Adrian, Mich.
Michigan Southern Division	James K. Taylor	John Kirby	Adrian, Mich.
Michigan Southern Division	B. H. Kidder.		La Porte, Ind.
Lake Shore Division	‡A. Congdon	A. Congdon	Cleveland, Ohio.
M			
Macon & Augusta			Macon, Ga.
Maine Central	J. W. Philbrick		Waterville, Me.
Macon & Western	Wm. McCandless	James A. Knight	Macon, Ga.
Manchester & Lawrence	Edward Studley	M. W. Dickerman	Concord, N. H.
Macon & Brunswick	M. Thornton	M. Thornton	Macon, Ga
Maysville & Lexington			Maysville, Ky.
Marietta & Cincinnati	E. Bosley	E. Bosley	Chillicothe, Ohio.
Memphis, Clarksville & Louisville			Clarksville, Tenn.
Memphis & Little Rock	D. R. Wing		Little Rock, Ark.
Memphis & Charleston	Michael Burk	A. W. Drew	Memphis, Tenn.
Memphis & Charleston	L. M. Sellars.	Thomas Varun	Huntsville, Ala.
Mineral Point	Robert Hay		Mineral Point, Wis.
Mississippi & Tennessee	Henry Teague		Memphis, Tenn.
Mississippi Central	Henry Gibbon	John E. Becton	Water Valley, Miss.
Maryland & Delaware	Samuel Peters		Greensboro, Md.
Mississippi, Gains. & Tus			Gainsville, Ala.
Midland Pacific			Nebraska City, Neb.
Milwaukee & St. Paul		Wm. E. Kettridge	Milwaukee, Wis.
Milwaukee & St. Paul		John Baillie	Milwaukee. Wis.
Minnesota, Iowa & Dakota Division	James Waters	D. F. Wilson	Minneapolis Minn.
Michigan Central	A. S. Sweet, Jr	J. B. Sutherland	Detroit, Mich.
Montgomery & West-Point	J. McVey	W. H. Daniels	Montgomery, Ala.
Montgomery & Eufaula	James McCann	I. E. Holmes	Montgomery, Ala.
Mobile & Montgomery	James McFarland.	L. Barham	Montgomery, Ala.
Mobile & Girard	William Eyles	A. J. Nix	Girard, Ala.
Mobile & Ohio	G. D. Linning	John McHugh	Mobile, Ala.
Missouri River, Fort Scott & Gulf	John McCrumm		Kansas City, Mo.
N			
Nashville & Chattanooga	John U. Eastman	J. G. Sawyer	Nashville, Tenn.
Nashville & Decatur	C. B. Knowles	C. B. Knowles	Nashville, Tenn.
New-Bedford & Taunton	Robert Chase	Robert Chase	New-Bedford, Mass.
New-Canaan			New-Canaan, Ct.
New-Brunswick & Canada	T. Armstrong	T. Armstrong	SaintAndrew's, N.B.
New-Haven & Northampton	Henry Fox.	Henry Fox	Westfield, Mass.
New-York & Oswego Midland	Wm. H. Griggs		Oneida, N. Y.
New-York & Harlem	Wm. M. Strong	Leander Garey	New-York.
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O

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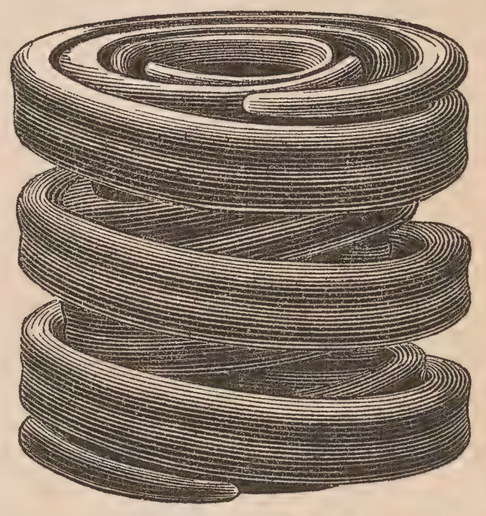

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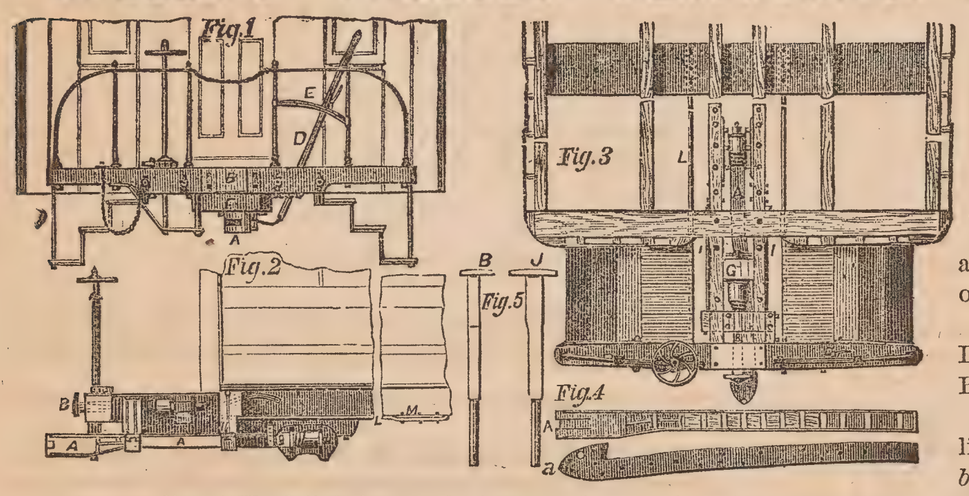

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DESCRIPTION.

Figure 1 is an elevation; Figure 2, a longitudinal section; Figure 3, a plan of an end of a car to which the arrangement has been applied; and Figures 4 and 5 show top and side views of the "Hook" and "Buffer," drawn on a larger scale than that of Figures 1, 2, and 3.

The letters refer to the same parts in all the figures. A is the coupling "Hook," B the "Buffer," C the "Stop," D the "Lever," E the "Quadrant Ratchet," F the "Truss Beam," G the "Spring Beam," H the "Suspender Beam," I the "Upward Trusses," K the "Main Spring," L the "Downward Trusses," and M the "Bolster."

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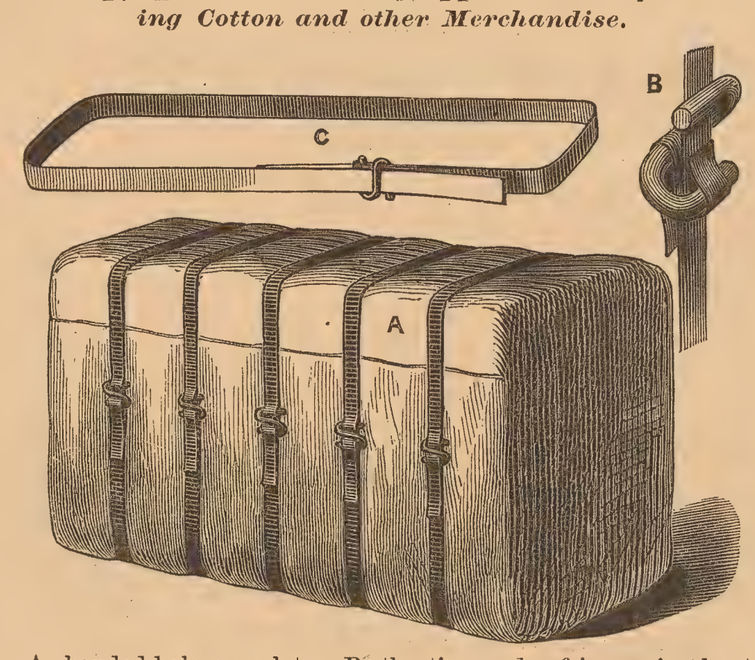

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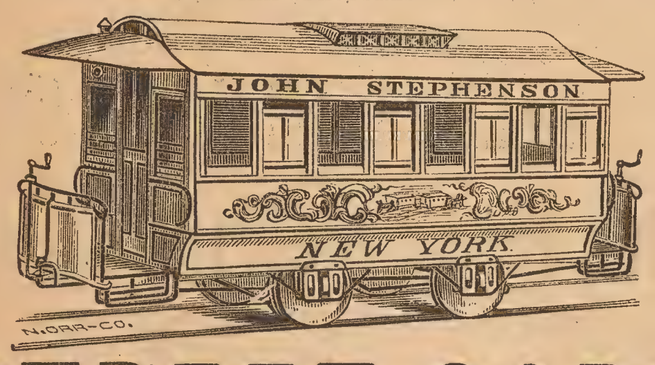

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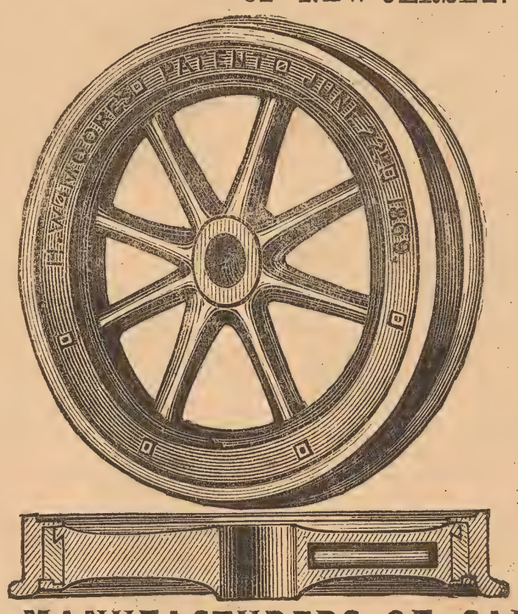

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Criticism of the Pullman Cars.

THE following suggestions for improvements in the Pullman cars is from a correspondent of the *Scientific American*, who was with the Boston Board of Trade on their excursion from Boston to San Francisco and back:

"The excursion train of the Board of Trade of Boston was a success, and I desire to add my testimony to that of the party which went in the Pullman train, as to the excellence of the arrangements, which far surpassed any thing I have found here or elsewhere. Considering the number of persons, the extent of the journey, the magnitude of the grades, the beauty of the scenery at several points, it may be truly said that the excursion was a great success, and stands unrivaled in the annals of railroad traveling. It must be acknowledged that Messrs Pullman deserve much credit for their enterprise and ingenuity. At the same time, it would be a libel on their intelligence to say that improvements can not be made in the palace-cars. Having had much experience in them, and having given much thought to the subject, I trust I shall not be considered querulous if I suggest some alterations which I am sure will be considered improvements by the class of travelers who generally occupy the palace-cars, and are willing to pay to be comfortable.

"Taking for dimensions the actual measurement of a 'drawing-room car' built by the Chicago, Burlington, and Quincy road, at Aurora, Ill., namely, from buffer to buffer, 64 feet, as the standard or maximum length, and deducting 7 feet for platforms, etc., in order to get the inside dimensions, we have 57 feet. Six lengths of couches, including the partitions and one state-room, at 7 feet, 49 feet, leaving for wash-stand and water-closet 8 feet. The 'saloon-car' measures 3 feet 4 inches more. I presume this space to be occupied by the organ on one side and a linen closet and desk, or secretary, on the other.

"The principal defect in these cars is the want of sufficient accommodation for ablutions, etc. There are only two wash-basins for twenty-eight persons, supposing that only two occupy each section and the two state-rooms. There are only two water-closets, and, as these have no water, they should be called dry-closets, or broom-closets. The next defect is in the unnecessary width of the couches for one person. They are about 40 inches, which, allowing for the sides of the car, and calling the outside width 9 feet 11½ inches, leaves about 3 feet space between the lower couches. About half of this space is taken up by the curtains when the berths are made up for the night, so that, when every body is stowed away, a clear space remains for the conductor or servants to pass along of about 18 inches, enough for that purpose, but not enough to enable one to dress in with any degree of convenience.

"Now for the remedies. Discard one state-room in the 64-feet car, and put in one or two wash-basins and another water-closet, to be allotted to ladies, and in the 67-feet car leave out the organ and secretary, and give more washing-room and more closet-room. Put into every water-closet a small tank and a portable basin, towels, etc., and enlarge the aperture in the seat, as well as the conductor from the seat downward. These small alterations will add much to the sanitary comfort of valetudinarians, as well as all others. To the first they are absolutely essential.

"As to the couches, if I can not have them in the centre of the car, leaving a space for servants on each side, and assuming that a section is to lodge only two persons, I would have them only 30 inches wide, giving 20 inches more in the centre, which would add much to the comfort by day, and to the convenience for dressing in the morning, and going to bed at night.

"The present couches are very badly formed for comfort by day, the seat being very hard, rounded in form, and with no convenient back or arms to rest upon. These should be upholstered with reference to the comfort of the occupants by day. Space enough should be left under the couches to stow away small valises, bags, and bundles, which now occupy the limited centre space, or are put away in distant closets, to the inconvenience of passengers. Now there is only room under the couches to lose boots, shoes, and umbrellas. In order to give the required room, the seat need not be raised, nor the cushions curtailed. All that is wanted is to leave off the deep ornamental facing-board. More conveniences are wanted for hanging up small articles, and some better arrangement for locking the upper berth. The present handle is much in the way of the heads of those occupying the lower couches in dressing. The system of ventilation seemed to be imperfect; the occupant of the lower couch can control his window, and let in air, rain, or cinders at pleasure; but the occupant of the upper couch gets only a modicum of air, filtered through the lower atmosphere."

* * * * * *

"Having touched on some of the inconveniences, which all admit in the arrangements for the outward man, I must say a word as to the commissariat cars and appendages. The one I measured was 59 feet long. The amount of space, the weight and cost of the cooking-room, where some stores are also kept, are far beyond the necessities or wants of the traveler, who looks most to comfort, health, and economy. The attempt usually made to furnish a bill of fare equal to Delmonico or Parker, is not only a failure in quality, but a grievance in cost, and it also involves great heat in the dining-car. In my experience, the cooking-room was invariably in the front end of the car, so that all the heat, and bad smells, and confusion of getting through a narrow passage, in contact with servants and cooks, became a positive evil. I can conceive of no reason for ventilating the cooks at the expense of the passengers, unless it be thought that the more uncomfortable they make the latter, the less they will consume."

Passenger-Cars.

FOR substantial comfort of passengers at all seasons, there is no car that approaches in this respect the common American car, without compartments and with the monitor top. These cars can be easily ventilated through the side windows and the monitor windows or automatic ventilators, and they can be safely warmed, or rather heated, for the latter is the proper term, and with proper care a due proportion of fresh air and heat can be secured for comparative comfort in these respects. Beyond this there is very little real comfort to be found, except in the celerity and comparative safety of travel. Each passenger has to suffer his proportion from the dust, smoke, gas, and cinders, which no inventor has as yet practically succeeded in finding devices to keep out of the cars. All these can be excluded, doubtless; but in excluding them the passengers suffer from want of fresh air, the deprivation of which is a cause of greater discomfort than all the rest of the combined nuisances together. It must be confessed that all attempts to improve in this matter have met with but little success. The different classes of drawing-room cars, compartment-cars, etc., which are built to gratify persons who desire exclusiveness, all lack the great desideratum, fresh air, and the passenger has to suffer and pay a severe price for his attempt at a little extra gentility and exclusiveness. While we, with all the traveling public, heartily wish that the comforts of the common passenger-car could be increased by excluding the dust and smoke without depriving the passenger of a free supply of air, we suppose we must be content for the time; but there are possible improvements applicable to all passenger-cars that should be insisted upon. Many cars have a badly arranged system of elasticity, having either springs too stiff for the load, or too limber, as the case may be. In one case the passenger has to submit to a succession of hard jarring movements excessively annoying and tiresome, while in another the car will rock and sway until it is next to an impossibility for the passenger to sit still, much less to walk or stand, while the train is going at twenty-five or thirty miles to the hour. Now, it is perfectly possible to arrange the springs under cars so as to secure an easy and agreeable motion, avoiding the hard jar which racks the bones and brains, and the pitching and swaying motion which leads one to fear an attack of sea-sickness. Something depends upon the smoothness of the track, but an old experienced rider knows that there is a wide difference in the movement of cars in the same train, and he soon finds the one that suits him best. The system of springs which allows of the easiest movement and the most comfort to the passenger, is the most economical to the railway company, for reasons obvious enough to any one familiar with railway operation. All hard-riding cars are a source of unnecessary expense, as they not only wear themselves out faster, but they wear the rail and track faster than those with an easy gliding movement.

This requisite ease of movement is always secured on some roads, while on others some part of the rolling stock is always deficient in it.

This difference is the result of the difference in the men who have charge of the construction or repair of the rolling stock. So one man may be valuable to the interests of the railway company, while another may be extremely prejudicial. This matter is of importance enough to attract the particular attention of managers, and a little attention at the right time may save a good deal of money, to say nothing of the extra comfort attained. And speaking of *attention*, what valid excuse is there for hot journals? They are invariably caused by want of skill or by neglect. On some roads they are a matter of daily occurrence, while on others they are never heard of, showing that it is a matter entirely dependent on the amount of skill and care used. The Boston express train on the New-York and New-Haven road was detained a dozen miles out of New-York recently by a hot journal, and a great deal of valuable time wasted by some one's want of skill or care, to say nothing of the expense of the journal and the pounding of the train backward and forward to get rid of the car. We have been holding the locomotive department of our roads up to a pretty strict rule, and it may be well to give a little attention to the way the other rolling stock is made, repaired, and operated. In fact, there is great need of a pretty effective reform on some of the roads, commencing with the framing of the car, and so on to all the details of daily operation.—*American Railway Times.*

Electro-Magnetic Signal.

MR. W. ROBINSON, of Brooklyn, has patented an apparatus for signaling by the train while in motion any break in the main track on a line of railroad by the displacement of a switch or opening of a draw-bridge. The invention includes an independent circuit-breaker and closer, and additional circuit for sounding a bell or alarm audible at the station, and displaying a signal, visible to the engine-driver in advance, by the displacement of the switch or draw-bridge whenever the engine or train operates a main or primary circuit-breaker and closer, but which is inoperative when the switch or draw bridge is displaced, except on approach of the train or passage of it over the primary circuit-closer, thus dispensing with waste of the chemicals used in the battery. The invention also includes an irregular spacing of the circuit-breaker for operation in connection either with an irregular spaced or ordinary circuit-closer to indicate, by the intermissions in the sounding of the alarm, the direction in which the train is traveling.—*Chicago Railroad Gazette.*

An Easy Thing.

WHAT an easy thing it is to pilot a crowded ferry boat over the East River, and to carry her into the slip without a bump or a shock. Try it! Also, what an easy thing it is to drive a locomotive; pull a lever—away she goes; pull another—she slacks up and stops. That's all. The quick eye, firm hand, prompt courage, the knowledge of every furlong of the road, the putting on steam on an ascent, or the shutting off on a down-grade, the difference of expansion in the rails between hot and cold, wet and dry—and the perpetual risk of life, and limb, and property—are matters unknown to the people who pay their fare, take their tickets, and get to their journey's end. All the while their lives have been in the hands of a grimy-looking man at the end of the train, whom, if they meet him on the platform, they avoid lest they should soil their silks or kerseymeres by the contact. These men should be, and often are, scientifically educated; but they have no social position; and their wages are absolutely inadequate to their responsibilities. The gentlemanly conductor is a personage of consideration, the petted of passengers, and the respected of directors. The engineer is a mere mechanic. The world is full of irregularities and injustice.

Paymaster's Car.

THE new paymaster's car of the North-Missouri Railroad Company is one of the most superb and capacious specimens of railway architecture yet built in the West, having compartments for the pay-office, and an elegant drawing-room, which can be transferred into a most comfortable sleeping apartment, and again into a dining-car, to accommodate eighteen persons in both capacities. The cushions of the seats are downy in their softness, and the mattresses and bedding are of the most comfortable character. The car has a balcony at the rear end, whereon parties can sit and enjoy the air and scenery in warm weather with perfect safety, while the train is going. There is also a kitchen, pantry, and wash-room, located between the drawing-room and pay department.

The car is set upon patent long-coupled, four-wheel trucks, which, we are assured, secure greater smoothness of movement than the six-wheel trucks. It is of massive octagon finish and of tasteful ornamentation outside; within, the panel-work is in beautiful natural grain walnut. This splendid coach was constructed throughout at the coach-works of the North-Missouri Railroad at St. Louis, under the special supervision of Mr. C. S. Buck, superintendent of the works. —*Leavenworth Bulletin.*

GEN. THOMAS A. MORRIS, President of the Indiana and St. Louis Railroad, has been appointed receiver for the Indianapolis, Cincinnati and Lafayette Railroad, on complaint of several of the leading stockholders. It is alleged that the road is perfectly solvent, and is valued at twelve million dollars, but for the fact of its being cumbered with a debt of several thousand dollars for the construction of branch roads, which are dead weights. The road being pressed to meet their construction and equipment accounts, was unable to do so, and the directors concluded that it would be better to put the road in the hands of a receiver than to permit it to go into bankruptcy.

Railroad Consolidation.

WHAT is to be the final result of the process of railroad consolidation which has been going on in the United States for several years? It is not to be denied that the interests of the traveling public are best served, so far as comfort and speed is concerned, by the organization of great through lines; but it is questionable if that advantage is not more than counterbalanced by the disregard of local interests and rights which is sure to follow these combinations. When originally built, most of the railroads were short lines, and obtained valuable franchises in consideration of anticipated local advantages. In many cases, the right of way was granted for much less than they were really worth; it was often donated outright by owners along the routes, upon the implied consideration that the roads would be a valuable means of local development, in which both the roads and the owners should perpetually participate. By consolidation, that contract is necessarily violated. It is urged that the requirements of the country are inexorable, and that great through lines are the creations of necessity, growing out of our rapidly expanding civilization; that they strengthen the body politic by bringing remote regions into more rapid, and consequently into closer communication, and that local interests must give way to larger exigencies. To a certain extent this is undoubtedly true; but we submit that it is a mistaken policy for railroad managers to ignore local interests and demands, and to reach out so eagerly as they do for through business. Experience has demonstrated that the latter is not nearly so profitable as the former, and besides, it is extremely bad policy for any road to alienate the friendship of the residents along its line.—*Pittsburg Chronicle.*

THE Boston and Albany Railroad is converting its old ties into charcoal for use in its machine and blacksmith-shops.

Asiatic Railways.

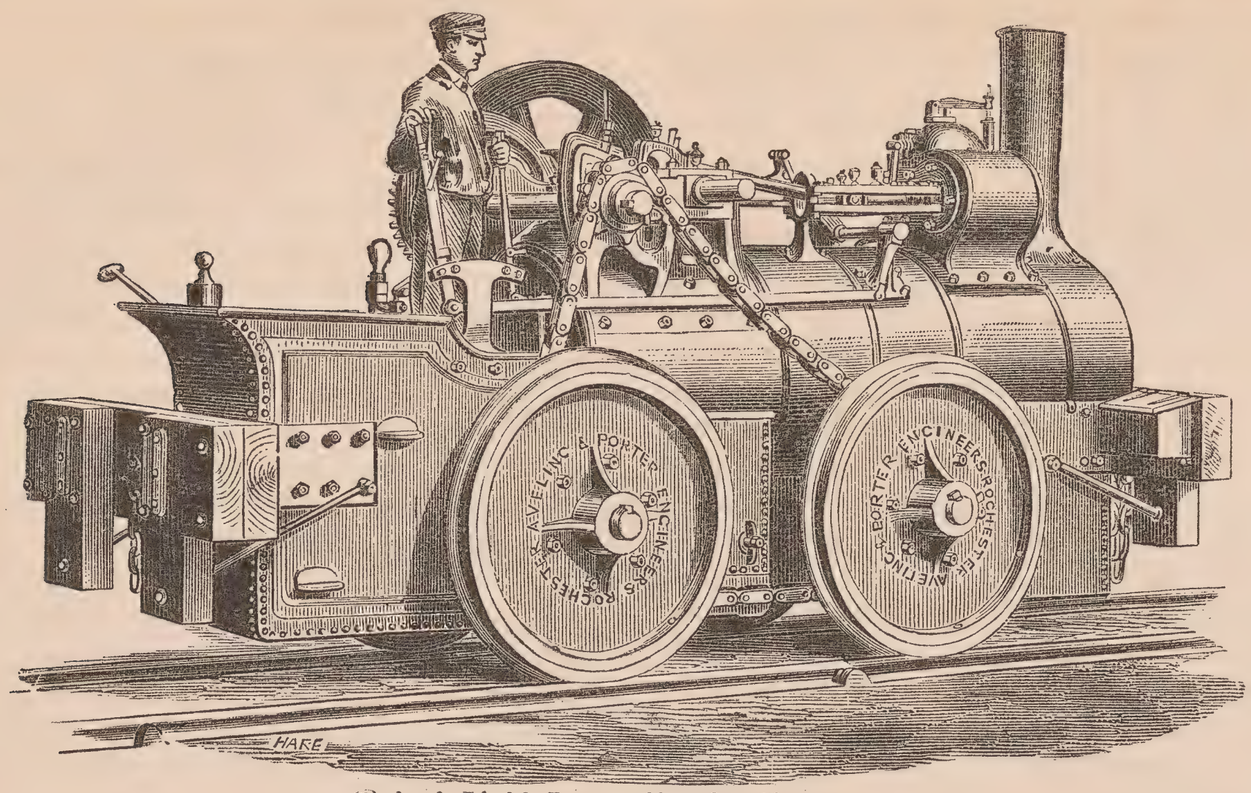
RAILWAYS are fast encompassing the world, and are, indeed, the heralds not only of active commercial enterprise and prosperity, but also of advanced civilization. Last spring a new railroad was opened in India, which, foreign journals say, promises to materially affect the relative standing of two of the chief cities. This road, as we learn, connects Bombay with Calcutta, the capital of India. The distance is nearly 1400 miles, and is made in sixty-two hours, which is a little over twenty-two miles per hour. The fare for first-class is about $75. A great rush of passengers through Bombay to all parts of India has commenced, and the road will soon possess an important attraction by the introduction of American palace-cars, which will vastly add to the comfort of travel. This road traverses the principal cotton districts of the country, and Bombay must become the cotton port for the large European trade. This will materially affect the prosperity of the capital, Calcutta, and prognostications are very freely indulged in that she will pale fast before the rising glory of her rival on the Sea of Araby. Railroad development has proceeded very actively in India for some years past, and, of course, has most essentially benefited the country. It has made accessible quarters that were previously quite shut out from the world for lack of transport, and has increased cultivation considerably, and brought increased wealth to the people. Another new road, called the Chord Line, will be available for traffic shortly, and will open up a country teeming with mineral wealth and agricultural resources. Others, on both the great Indian and East-Indian lines, are being pushed into districts where the name of a locomotive heretofore was scarcely known.—*Philadelphia Ledger.*

Railroad Signals.

A RECENT invention, says the New-York *Tribune*, which has been favorably spoken of by railroad men, seems to add considerable certainty, facility, and economy in signaling trains. It is designated as a "lantern and combination of railroad signals," and includes both night and day signals. The night signals consist of sliding glass globes, three in number, which, by a perfectly simple arrangement, are successively made to cover the flame, so as to give the white light, indicating "all right;" the blue light, for "caution;" and the red light, to "stop." These are the signals now generally used, and three separate lanterns are required to display them. The combination is adapted for use both in lanterns to be carried in the hand, and also to be elevated on a permanent staff. The day signals, according to the models shown, and as now in experimental use upon several roads in the vicinity of New-York, are white, blue, and red boards, folding like a jack-knife into the same staff upon which the lantern is placed, and readily lifted to a horizontal position, as required, by a very simple and ingenious device of pulleys.

Railroad Gates.

MR. S. P. BAKER, an English inventor, proposes to arrange by the side of the line of railway a treadle-bar in such a position that a train in passing along the line shall depress the treadle, and in so doing act through suitable levers or instruments on a rod or wire passing to the gate, to be locked and unlocked where it gives motion to a leading plate or bolt which in one position allows the gate to work freely, and in another locks it fast. A train then, in approaching the gate, comes on the treadle, and so moves the locking plate or bolt as to fasten the gate to prevent persons entering upon the line. When the train has passed the gate, it acts on a second treadle, which again moves the locking plate or bolt, and sets the gate free; or, by a simple arrangement, the gate may be unlocked after a short-measured interval of time after locking.—*Chicago R. R. Gazette.*



Patent Light Locomotive for Tramways.

Patent Light Locomotive for Tramways.

THE engraving represents one of Aveling & Porter's light locomotives for tramways, mines, quarries, dock-yards, etc., in the construction of which the distinguishing features of their road traction-engines have been adhered to; the only important alteration being that of adapting them to the requirements of a line of rails. In comparison with other tramway-engines, one great and special advantage of those made by the above-named firm is, that they are so constructed as to be applicable for driving all kinds of fixed or portable machinery in addition to their primary use of conveying material or freight. They are made of any size, from four to twenty horse-power, (English,) will ascend inclines of one in twenty, and can be made to work round curves of thirty-five feet radius. They are simple in construction, consume far less fuel for the amount of work performed, and cost less than any engine of this description in use. They are made to suit any width of gauge, can be driven by an ordinary laborer, and in material and workmanship are equal to the best description of English locomotives. They are supplied with wheels made of chilled cast-iron, or of cast-iron with crucible-steel tires. We copy from the circular of the agent of Messrs. Aveling & Porter, Mr. William Churchill Oastler, No. 43 Exchange Place, New-York, the following extract descriptive of the engine illustrated by the engraving:

"Messrs. Aveling & Porter are well known as successful makers of traction-engines, and in their tramway locomotive they have adhered in many points to their usual plan of construction for road-engines. In fact, their locomotive may be described as a traction-engine placed upon railway-wheels, these wheels being coupled by the pitch-chain which is employed to communicate the motion to them. Our illustration represents one of three engines of this class supplied by Messrs. Aveling & Porter to the Grays Chalk Quarries Company, at whose works they are now regularly employed. The engine is rated at ten horse-power nominal, and has a single cylinder ten inches in diameter, with a twelve-inch stroke, this cylinder being fixed on the top of the boiler and surrounded by a steam-jacket, as in their other engines. From the crank-shaft the motion is communicated by spur gearing to a countershaft carrying at its end the wheel for the pitch-chain, the bearings of this shaft being placed in curved slots formed in the supporting brackets, so that the shaft can be raised and the chain tightened when necessary. The crank-shaft carries a fly-wheel, and the engine is fitted with the usual link-motion reversing-gear. The pitch-chain extends from the countershaft round the chain-wheels fixed one inside each of the carrying wheels, and the chain thus couples the wheels together as well as communicates the motion of the countershaft to them. The carrying-wheels are four feet in diameter, and are placed at a distance of five feet three inches apart from centre to centre, the leading axle passing under the barrel of the boiler, and the trailing one being placed behind the fire-box casing. The boiler is of the ordinary locomotive class and contains 60 tubes 2¼ inches in diameter outside, and 5 feet 6 inches long, these giving an external heating-surface of 194 square feet. The fire-box is 3 feet long by 2 feet 7 inches wide and 2 feet 7 inches high, and, deducting the space taken up by the fire-hole door, etc., it consequently has a heating-surface of about 28 square feet, making a total heating surface of 222 square feet. The fire-grate area is 7¾ square feet, and the boiler is usually worked at a pressure of 80 lbs. per square inch. The boiler is fed by a pump worked by an eccentric on the crank shaft, and the feed-water is carried in a couple of tanks, one placed at the leading and the other at the trailing end of the engine, these tanks holding together about 350 gallons. The fuel is carried in a coal-bunker formed on the foot-plate behind the fire-box, sufficient space being provided to accommodate from 10 cwt. to 20 cwt. of coal, according to the mode of packing."

These engines are in use in various places in England, and have given abundant evidence of being well adapted for use in quarries, and in all places where heavy loads have to be moved at a slow speed; and in such cases they will do the work at about half the cost incurred by the employment of horse-power.

The Movements of Railway Wheels around Curves.

A CORRESPONDENT submits to us the following question: "As a train of cars moves around a curve, the outside wheels have to go a greater distance than the inside ones, and yet both wheels have to turn around the same number of times. Now, as the four wheels are all firmly fixed to the track, how does the outside wheel manage to keep up with the inside one, having to go a greater distance than the other, yet turning around the same number of times?"

The same question had been previously submitted to the editor of *Haney's Journal*, who, instead of replying, met the question with the following query: "*Query to the above: Does* the wheel on the inner curve turn around as often as that on the outer? To our thinking, it does not, but often acts as a pivot. Turn, for instance, a sulky with rather a short turn, and observe the different action of the two wheels. If the two wheels did revolve on their axes equally, it would be impossible to turn a curve with them, to our thinking."

The editor above referred to evidently does not know, as most of our readers do, that railway wheels, instead of being loose on their axles, like those of sulkies, are fast thereon, and that consequently the two wheels must revolve together equally. The result of this is the slipping of one or both wheels upon the track in turning a curve.—*American Artisan.*

Davis's Refrigerator-Car.

ONE of these cars having recently arrived in this city from California with a load of fruit in a good state of preservation, the *Scientific American*, in a notice of the car, gives the following particulars of its construction and the manner in which the refrigeration is accomplished:

"The shell of the car consists exteriorly of the ordinary wood casing. A second wooden shell is made smaller than the first, and placed within it, so as to leave an air-space or chamber entirely around the top, bottom, and sides of the car. Within this second shell is placed a layer of hair, about two inches in thickness, and this again is lined with an interior wooden shell. This construction makes a non-radiating and non-conducting compound shell or case, of great power to resist the action of external heat, and renders the expenditure of ice quite small to maintain the required depression of temperature, after the interior of the car and its contents have been cooled down to the proper point, say from 34° to 38° Fahr.

"The refrigeration is accomplished in the following manner: Along the sides of the car are placed sheet-metal tanks shaped like the frustra of very gradually tapering wedges. They extend from the top to the bottom of the car, and are about five inches thick at the top and two and one half inches at the bottom. These tanks communicate at the top with the exterior of the car through funnel or hopper-shaped openings, and at the bottom through drip-pipes which convey away the moisture. The funnel-shaped openings at the top are used for putting in the refrigerating mixture, consisting of broken ice and salt, and are provided with air-tight covers. The car is entered through a hatchway at the top, through which its freight is also introduced. This hatchway is also provided with a tight-fitting cover, made non-radiating and non-conducting like the sides of the car.

"The store of ice and salt for the trip is contained in a separate department in one end of the car, so that its contents can be reached, and the refrigerating tanks supplied without opening the freight-room.

"The freight is placed in the car on strips of board, strips of board also preventing its coming in contact with the walls of the refrigerating tanks. The packages are also so placed as to leave interspaces through, between, and around each. During the process of refrigeration the air circulates around the packages and along the sides of the tanks like water in a steam-boiler, the colder air falling, and the warmer air rising to the top, becoming chilled in its passage along the sides of the tanks, and depositing its moisture on the tanks till their sides are covered with a thick stratum of congealed water or hoar-frost. Thus the air is not only cooled but dried, no accession of moisture being derived from the external air or from the ice in the tanks, with either of which the interior of the car has no communication so long as the car is kept closed.

"The two essentials for the preservation of substances liable to ferment, namely, absence of heat and of moisture, are thus secured in a very perfect manner, and the arrangement of the tanks is such that the space within the car for the storage of freight is not materially reduced. Some addition to the refrigerative mixture in the tanks is made each day, and the temperature is easily regulated and kept at the desired point by the addition of more or less salt in proportion to the charge of ice."

AN exchange says that an apparatus has recently been invented which promises to do away with the annoyance and danger arising from the cinders and sparks that are constantly flying from a locomotive's smoke-stack. By means of a simple but ingenious contrivance, the cinders are taken from the smoke-stack and carried into the fire, where they are consumed, and thus add to the heat. The invention has been satisfactorily tested on the Nashua road.

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The name and address of the writer must accompany all communications designed for publication.

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Engravings and Illustrations.

We would invite the attention of Master Car-Builders and others to the advantages to be derived from publishing in The National Car-Builder *engravings designed to illustrate the various features and details of car construction, and especially such improvements as can not otherwise be clearly presented. We will procure cuts to be made in the best manner from drawings or models that may be sent us, and charge only for the cost of engraving, inserting the same in our paper with suitable descriptive details, without charge. The cuts thus made by us, or that may be sent us for use in* The National Car-Builder, *will of course be returned promptly to the owner.*

We received too late for insertion in our present number a communication on the subject of the Mobile and Ohio Railroad car-trucks, and in reply to the strictures and inquiries of our correspondent "X," in our last number. It will appear in our next issue.

We invite the attention of our readers to the advertisement of "Wendell's Patent Journal-Bearing Company," which will be found on another page, with engravings illustrating their new self-oiling journal-bearing. This invention, as an improved method of lubrication, is said to be a very effective and economical remedy for hot journals, having been thoroughly tested on several of the principal roads of the country. The company is now prepared to fill orders. Address 59 John street, or Post-Office Box 5118.

On the fourth page of our cover will be found the advertisement of Mr. C. D. Fredericks, 587 Broadway, who is prepared to supply the public with "Glynn's Anti-Incrustator for Steam Boilers," a reliable and effective remedy for removing and preventing incrustation, without injury to the metal and without foaming.

The Pullman Palace-Car Company has just received three new sleeping-cars and one drawing-room car, one manufactured at Detroit, one at Aurora, Ill., and one at Fond du Lac, Wis. One will run between St. Louis and Louisville on the Vandalia line, and two on the Alleghany Valley Railroad. Seven more cars are on the stocks for this company.

Erie Railway Sleeping and Drawing-Room Coaches.

In our last issue, we mentioned, in a brief paragraph, that the Erie Railway Company was building, at its car-shops in Jersey City six elegant sleeping and drawing-room coaches, and promised to give our readers a more particular description of them at an early day. This we are now prepared to do, having recently visited the shops, where we availed ourselves of the politeness of the superintendent, Mr. C. A. Smith, who afforded us every facility for examining these beautiful specimens of car-construction. In view of the present requirements of the traveling public, and the progressive improvements which have within the past few years been introduced in the passenger equipment of our railways, we were prepared to see something that would go far toward meeting the expectations of the most exacting and fastidious, and in this we were not disappointed. We venture to say that in all the requisites of a first-class traveling vehicle—in the latest railway signification of the term—including good material, substantial workmanship, excellent taste in furniture and decoration, and the application of the most approved methods and devices for securing the safety and comfort of passengers, these cars may safely challenge comparison with the best of their class that have been produced; if, indeed, they may not be regarded as models for imitation. We dare say there are sleeping and drawing-room coaches now running on our roads, or being turned out from our car-shops, that are more showy and attractive to a superficial observer, more stunning in the profusion of tawdry ornament and flashy finery, or perhaps more costly in labor misapplied; but as regards utility and elegance so combined that one seems the natural counterpart of the other, with nothing to offend a taste disciplined to detect incongruities, and blemishes, and inharmonious combinations, these coaches of the Erie Railway present scarcely any points to justify adverse criticism. There is nothing about them calculated to produce a mere transient effect, regardless of a permanent and abiding impression. We say this because we have seen cars—costly ones too—that were artistically mistakes and failures, made to look at, like a theatrical drop-curtain, and suggestive of little else than ostentation, parade, and display. This kind of work will have its day, and will be succeeded by something less fantastic, and more in accordance with the requirements of good taste.

Four of the six coaches referred to are named, respectively, "The Morning Star," "The Evening Star," "Col. James Fisk, Jr.," and "Jay Gould." The first two are completely finished and ready for the track; the other two are nearly ready, and the two not yet named will not be ready for several weeks. With the exception of some minor details in the interior finishing, the four we have named are so nearly alike that a description of one will suffice for all; and for this purpose we will take the "Evening Star." This car is fifty-six feet in length and eleven feet wide, the width being adapted to the broad gauge of the track, which admits of a car some sixteen inches wider than the ordinary gauge. This additional space, of course, adds correspondingly to the convenience of the occupants. The interior is divided into fourteen sections. These include one state-room which accommodates four persons, and one family-room which accommodates six. This last-named room, although large and spacious, can, at the pleasure of the occupants, be made strictly private without interfering with the free transit through the car. It is furnished with a sofa-bed, an extra elevated berth on the opposite side, and two arm-chairs; the bedding in this room, as well as in other parts of the car, being so entirely spirited away in the day-time as to detract nothing from the general drawing-room aspect of the whole interior. At each end of the car are wash-rooms and closets; and at one end is a room for the exclusive use of the conductor and porter. The seats, chairs, and sofas are upholstered with French moquette tapestry, a material very rich in appearance, and harmonizing admirably with its surroundings. The design and construction of the section seats are such as to combine the utmost elegance with luxurious ease and comfort. No matter how uneasy, angular, or nervous the occupant may be, he can scarcely dispose himself in any way in which his projecting points will not be met by a cushion. The leading feature, however, of the interior fitting-up is the ornamental wood-work, consisting of black-walnut combined with French veneering and rosewood mouldings. In connection with this, we would make special mention of the elaborate wood-carving and scroll-work, brackets, rosettes, leafage, bits of drapery, and other tasteful devices in great variety, so disposed as to leave no blank spaces to meet the eye and suggest something lacking in the way of completeness. No expense seems to have been spared upon this part of the ornamentation, and we think the effect produced is a full equivalent for the outlay. Mirrors are introduced with moderation, and are so placed as to seem more a matter of convenience than for the purpose of duplicating by reflection every thing and every body in the car, and also tacitly implying—as very large and gorgeous ones are apt to imply—that the passengers have only small ones in their parlors at home. Mirrors are comparatively a cheap luxury, and "enough is as good as a feast." The same may be said of gilding, which in interior decoration should always be restricted to subordinate limits. We noticed very little, if any, in the car we are describing, and we think its absence a sufficient index of good taste to deserve mention. The large spaces or panels corresponding with the sections on the sides of the car are each occupied with two oil paintings, executed in a style rather better than is usually met with in railway-cars. The subjects of them are appropriate, and in tone and color do not clash with the surroundings. We would suggest, however, that if the labor expended on the two pictures for each panel had been bestowed upon one only, the effect would have been better, for obvious reasons. There are three windows to each section, a large central one, and a small narrow one on each side and on a line with the two seats. These small ones can be opened for ventilation without incommoding persons on the opposite seat, while the large one remains fast. These windows, as well as those inside the car, are of beautiful ornamental glass. The car is lighted with gas, which is conveyed from a tank under the floor to five elegant and costly chandeliers; and is warmed by Baker & Smith's heating apparatus, consisting of hot-water pipes running all around the car. The ventilation is secured by the roof-windows, and also by a ventilating-window over the doors at the ends of the car, which admits a continuous current of air while the train is in motion. These windows are protected on the outside by wire-gauze screens which intercept the sparks and cinders. It is scarcely necessary to say that the cars are supplied with the Miller platform, the utility of which is so universally recognized as to make it an indispensable adjunct of a well-built car. Six-wheel trucks are also used, constructed so as to lessen dead-weight as far as practicable, being some three tons lighter than the ordinary six-wheel truck. The outside finishing of the body of the car is devoid of excessive ornament in the way of gaudy paint and flaming devices, and is suited to the use for which it is designed, and the exposure to which it is necessarily subjected.

We think we have said enough, without going into further and more minute details, to give a tolerably correct idea of these cars. Very likely there may be defects that have escaped our notice. If so, they will doubtless be discovered sooner or later, and the remedy applied. But so far as our poor judgment goes, they are, in all essential features, fully up to the requirements of the traveling public, embodying all that is desirable for comfort and convenience, and all the appliances of luxury that circumstances will admitt or a reasonable being require. They are in every respect creditable to the road, and especially to the experience, mechanical skill, and good taste of Mr. C. A. Smith, under whose direction and superintendence they are being built.

Historical Sketch of Railway Cars.

In the beginning of this series of articles, we spoke of the absence of any correct and reliable history of car construction as being the source of much difficulty to the student and inquirer in their investigations of this branch of the mechanical arts. In saying this, we alluded more especially to the history of car construction upon European railroads; but the remark will apply with equal truth to our own roads, there not being within the knowledge of the writer any written history of the railroad-cars of America that will give even an idea of the different forms of construction which have been adopted; and hence it follows that, in what may be said in the present article, and in any that may follow upon this subject, the writer will have little but his own personal recollections to aid him in the descriptions he may give of this class of devices which perform so important a part in our inland commerce.

It is believed to be a conceded fact that the first railroad constructed in America was the one built for the purpose of conveying the blocks of granite which were being quarried at Quincy, Mass.; and upon this, it is fair to presume, that the first cars ever used in this country were placed. These cars were of the four-wheeled type; and were, of course, of rude construction, suited only to the kind of material to be transported upon them. After this road had been built, and the quarries fairly opened, it was found to be necessary, in order to supply the demand for large blocks of the stone, that cars capable of carrying a greater weight than those then upon the road should be had; and the only plan that could be devised was to place two of the cars near to each other, and so arrange a stick of timber transversely across each that it should rest upon its centre, and thus be capable of turning to some extent when either or both of the cars were upon a curve. Upon the tops of these transverse timbers others were placed, which were in line with the rails, and which, after being covered with planks, formed a platform-car capable of sustaining a block of granite of double the weight of any which had previously been transported. The car thus improvised in the stone quarry is believed to have been the first eight-wheeled car ever used in this country, if not actually the first ever constructed in the world.

In or about the year 1831, the Boston and Lowell Railroad Company obtained their charter, and proceeded to build their road, which, when completed, was supplied with four-wheeled cars for both passengers and freight. The passenger-cars of this line were compartment-cars, all the seats being upon the same level, but placed transversely across the car.

Other roads followed this in rapid succession; but it is not our purpose here to enter into any description of the roads, but only to speak of some of the distinguishing features of the cars used by some of them.

As the subject of eight-wheeled cars is the one now under consideration, it seems to be proper to first speak of the person or persons who introduced them, and to whom belongs the credit of making them a success. In February, 1827, and on the twelfth day of that month, there was a meeting called at the residence of George Brown, Esq., of Baltimore, Md., to discuss the propriety of constructing and equipping a railroad from that city to the Ohio River. At this meeting resolutions were adopted, and committees appointed, which resulted in the procurement of a charter, and finally in the commencement of that great work. On the fourth day of January, 1834, the directors of this road issued proposals for locomotives, which were not to exceed three and a half tons in weight, but which should be capable of drawing fifteen tons, inclusive of the weight of the cars, fifteen miles per hour, the company agreeing to furnish cars of Winans' make which should not offer a tractional resistance of more than five pounds to the ton. It need not be stated that the cars furnished were of the four-wheeled type, which form continued in use upon this road, and, indeed, upon all the roads in operation in the country, up to 1834; the passenger-cars being about the size of a stage-coach. At about the date last given, the increasing business upon this line made it necessary that cars of larger dimensions should be employed, and Mr. Winans was consulted, the result being that the four-wheeled cars were first enlarged, and finally the eight-wheeled type of car was adopted, for which Mr. Winans shortly after procured a patent.

While the events above narrated were transpiring in and around Baltimore, cars of a very peculiar construction were being made for what was then known as the Tonawanda road, extending from Rochester, N. Y., to Batavia, in the same State. Those cars were of the four wheeled type, the peculiarity of their construction consisting in the fact that they consisted of three compartments, the centre one of which was raised so much above the others that the seats thereof were about on a level with the heads of the passengers when seated in the end compartments. The architecture of the bodies was of the Grecian order, and, notwithstanding the fact that they were facetiously called the "camel-backed cars," it must be admitted that they presented a pleasing exterior appearance, while the interior arrangements afforded all the inconveniences that the most disobliging railroad manager could desire. As a great portion of the business of this line consisted in transporting wheat in bulk from points west of Rochester, it was found necessary to construct a large portion of the freight-cars with reference to this class of traffic, which was done by making the bodies of the cars in the form of huge hoppers with a valve in the bottom, the upper surfaces being provided with a roof or cover, which was hinged to the upper portion of the hopper, and so arranged that it could be opened to admit the grain, and be closed to protect it from the weather. The wheels and axles in use at the time of which we have been speaking were much the same as those now in use, except that the axles were much smaller, and especially that portion of them which constituted the journals, they being often not more than two inches in diameter, and seldom more than two and one fourth. The theory being, that to increase them in size would largely increase the friction, a fallacy which, for the interest of railroad companies, but more especially for the safety of passengers, it is to be hoped is by this time fully exploded. It is believed to be a fact that the first eight-wheeled passenger-car ever used upon any New-York railroad was upon what was then the Auburn and Syracuse road. This car was of a peculiar construction, the framework of the sides being placed at such angles as to cause the apertures for the windows to be diamond-shaped, they being so arranged as to slide between the angular portion of the frame, so as to leave the place occupied by them when closed, open when they were slid in either direction.

Upon the Auburn and Rochester road, when it was opened from Rochester to Canandaigua, eight-wheeled cars were placed, the truck frames of which were suspended below the journals of the axles, with a view of lowering the bodies of the cars to the greatest possible extent, in order that their vibrations upon the track should be less injurious thereto.

The method of lubricating the journals of cars at this time, say from 1840 to 1845, was by means of a grease-cup or box placed in the housing of the journal-box, but above the journal, which cup or box was usually filled with palm-oil, which, when the friction of the journal and its box was sufficiently great, would heat and soften the oil to such an extent as to cause it to run down upon the journal and lubricate it, provided the box did not melt before the oil was sufficiently softened.

The writer of this article witnessed an amusing scene connected with this method of lubricating car-journals, which it may not be out of place to mention here. Being at the time (1845) employed upon a Southern railroad, business frequently made it necessary for him to pass over the road from Petersburg, Va., to Weldon, N. C. During these trips it was observed that, upon sounding the whistle upon approaching the station, all the swine in the immediate neighborhood of the station were seen running at the top of their speed for the train. Observing this, his curiosity was excited, and he passed out of the cars with a view of ascertaining what the raid portended, when he found that the hogs were ranged along the train, each with his nose in an oil cup, regaling himself with the oil which had been deposited there for a very different purpose. It will be understood, of course, that the meal was enjoyed after the train had stopped at the station, it being only the work of a moment for each of the uninvited guests to raise the cover to the cup, and insert his long snout therein and extract his feast.

At about this time, considerable attention was directed to the subject of friction upon the flanges of the wheels of cars in passing around curves, as it was found that the flanges were being worn rapidly. To obviate this, various expedients were resorted to, one of which was to fit one of the wheels tightly upon the axle, while the other was so fitted as that the axle could rotate freely within it, it being held longitudinally by means of collars provided with set screws. Another device, which was introduced about the year 1850, was to put a sleeve upon the inner ends of two short axles, a wheel being secured to each, and the inner ends of the axles being allowed to rotate within the sleeve, an oil cup being provided at its centre to insure its lubrication. Neither of these devices were in use for any great length of time, owing to the fact that they were but a very imperfect remedy for the difficulty, and also to the fact that they could not be kept in condition for use for any considerable length of time.

Camp's Improved Dumping-Car.

We have been shown a drawing of this car, and have also seen a descriptive account of its peculiarities and mode of operation, from which we are led to believe that it is an improvement worthy of the attention of railroad managers. It is the invention of Rev. Doctor Camp, of Saratoga Springs, N. Y., who has assigned his interest in the same to Messrs. A. W. Rhoads & Co., of Wilkesbarre, Pa., whose advertisement will be found on another page, with accompanying illustrations showing the form and general features of the vehicle. The car is dumped by a very simple contrivance which is operated by a lever in the hands of a brakeman, thus doing away with the necessity of shoveling out the most of each load. By raising this lever, the body or hopper, as it is technically called, is released from two catches which hold it in an upright position, and the law of gravity causes it to roll over, describing an arc of forty-five degrees, and ejecting its contents as completely as if it were swept out. This is done with each car almost as fast as a man can walk from one to another, raising the lever of each as he comes to it. The hopper is returned to its position in readiness for another load, by the brakeman bearing his weight on the up-end of the tilting frame. It will be seen, from this brief and imperfect description, that this invention is likely to supply a want that has long been felt, in diminishing the cost in time and labor of gravel and construction trains. It costs no more to build the car than it does those now in use; it stands no higher, is built on a frame calculated to carry a larger load—say three and a quarter square yards—and as there is much less wear and tear in its operation, it is claimed by its inventor that it will outlast any that are now in use.

The burning of the New-York Central Railroad transfer-house at Buffalo, on the 9th instant, caused a loss in round numbers of $170,000, the whole of which, it is said, falls on the company. Fortunately there was no freight at the time in the transfer-house, and the cars were all empty, otherwise the loss would have been greater.

More Improvements Needed.

WITHIN the last few years great progress has been made in perfecting and beautifying the passenger equipment of our railways, especially that class of cars designed for the accommodation of through-train passengers who pay high fares. Every day some new device is brought into requisition to enhance the luxury of traveling upon the great leading lines, until the margin for further improvement would seem to be narrowed down to comparatively small dimensions. But while we are gratified that so much has been accomplished with respect to the particular class of cars referred to, we regret that a corresponding improvement is not manifest in other kinds, including the ordinary passenger-car, and especially the horse-cars of our cities. As respects these, much remains to be done to bring them up to a standard that will satisfy the expectations of the public. If one steps from the upholstered, carpeted, and mirrored drawing-room "coach" into the contracted, jammed, straw-floored, vermin-cushioned vehicles that trundle along our city avenues, he is sensible of a very great contrast in the character of the accommodations. To provide comfortable means of transit between up-town and down-town for the multitudes that throng our streets is, perhaps, a difficult thing to do, except by a very slow and gradual process. No one is so fanatical as to associate the idea of luxury with our street-cars, even as a remote or possible contingency; but a beginning might be made in the way of improvement, and we would suggest, as a first step, that some kind of substitute be devised for the holding-on straps; or, if these aids can not be dispensed with, we would recommend that each car be provided with two sets of straps, to be used alternately, so as to give one set a chance of being washed or cleansed in some way at least once a week—or oftener, when the income of the road will justify the outlay. This would be a beginning which might lead to great results in the future—perhaps to the realization of a city-railroad-horse-palace-coach!

Then, as regards some of the antiquated relics of rolling stock to be met with now and then on local and way trains, we would suggest a limit of service, or some method to determine whether they are legitimately cars or kindling-wood. We traveled several miles last week on one of these relics. We admit it was exceptional, but not such a rare exception as to forbid comment; nor is it important to name the locality, which could not be done without seeming invidious. It was early in the evening when we entered the vehicle. We saw at once there was some one in our seat, so we stood up. A kerosene lamp at either end, was shedding "disastrous twilight" in spite of a week's accumulation of lamp-black on the glass chimneys. Some sappy wood was smouldering in a stove with a bad draught. We knew when the train began to move by the rattling of the stove-pipe. The foot-rest under the seat in front of us had apparently been broken a good while. On obtaining a seat, we found the cushion so collapsed, uneven, and lumpy that we would have preferred the smooth side of a hemlock plank. We tried to raise the window, but the thumb-piece was gone; while we noticed another window that wouldn't stay up because there was no catch. The antique ornamental work of the car, the faded plush, soiled floor, etc., were partially invisible in the evening, but, doubtless, loomed up with great vividness by daylight. In fact there was nothing about the vehicle that reminded one of luxury except by contrast; or unless one's ideas of luxury are pretty well toned down. It was behind the age, with not the slightest chance of catching up with it. There are a good many such, we dare say, that are no credit to road or builder. They should be dismissed from service, and their places filled by something better.

THE Little Miami Railroad Company has commenced suits against six insurance companies to recover losses by a recent collision on their road.

Fig. 1

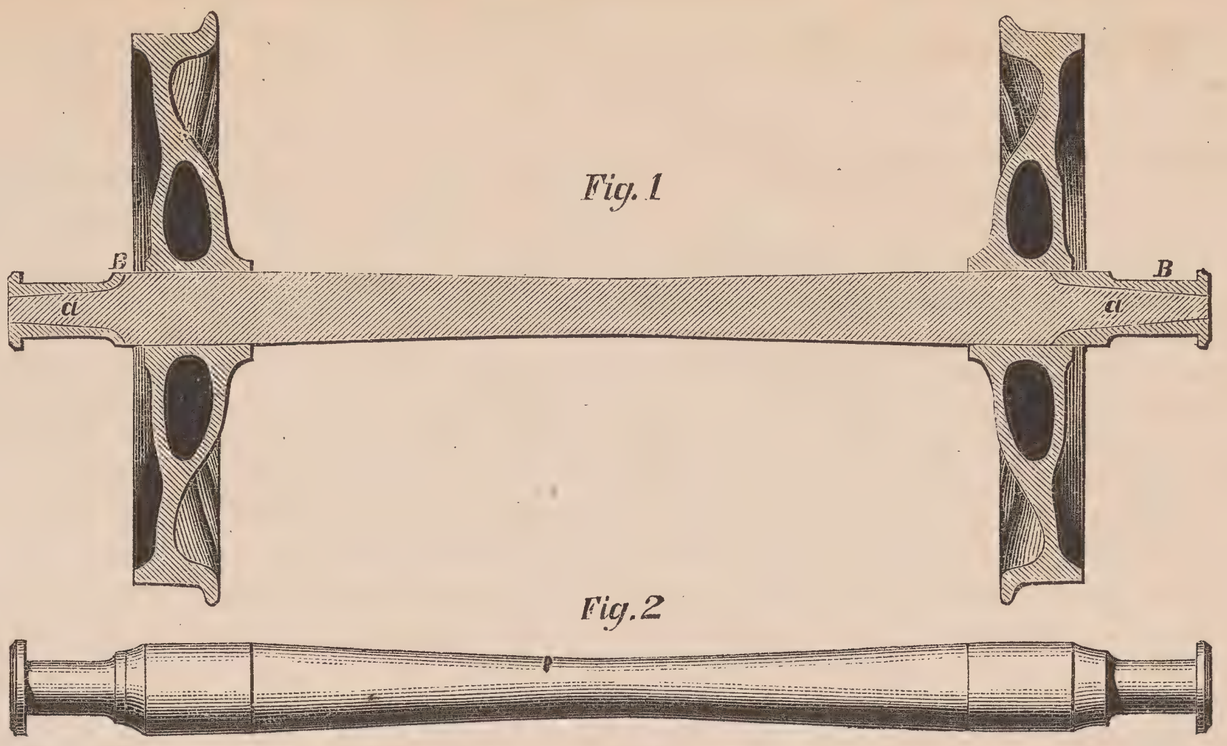

Fig. 2

Hoagland's Patent Car-Axle.

Hoagland's Patent Car-Axle.

WE copy from the *American Artisan* the following description of Hoagland's patent steel-clad railroad car-axle, with cuts illustrating the same, for which we are also indebted to that journal:

"The engravings show the nature of the invention so clearly that only a few words of explanation in addition are required. Fig. 1 is a longitudinal sectional view, showing the axle with wheels attached, while Fig. 2 is simply a side view of the axle alone.

"In Fig. 1, the axle is assumed to have the proportions of an Erie Railway 'No 4' axle, eight feet long, four and one half inches in diameter at the wheel-seats, and three and three fourths at the centre. Fig. 2 is presumed to be of the same size, except that the diameter at the wheel-seat is increased to five and a half inches; this latter being, moreover, believed to give greater safety and duration to the axle than the smaller diameter.

"The improvement consists in incasing the journals of an iron axle with fine cast-steel, extending the steel covering so as to include the shoulder of the journal, as shown at B in Fig. 1, in the engraving. Or it may extend to the centre of the hub of the wheel, as shown in the same figure on the right. The steel covering, when the axle is dressed, may be a quarter to a half-inch in thickness, or thicker if desired.

"The steel and iron are united by the well-known fusion process, carried out as follows: The end of the axle being drawn to a proper size to receive the steel, and being then brought to a welding-heat, the axle is placed in a vertical position; a mould placed over the heated end, into which melted steel is poured from the crucible, after which the end of the axle is placed under the hammer, to give form to the journal and density to the steel.

"'This method of uniting iron and steel,' says the inventor, 'is widely different from the blacksmith's weld. There is a mingling of the molecules of the two metals at the point of contact, and the union is complete.'

"The compound axle thus manufactured is claimed to possess all the safety of a tough fibrous iron axle, and to also afford all the advantages of a fine cast-steel axle, in the saving of motive power and in the saving of lubrication, and in its durability.

"'In speaking of this construction of car-axle,' writes the owner of the invention, 'it may not be amiss to consider the relative durability of the different parts of the axle, aside from its journals. Experience in operating railroads shows that the whole of the axle is not subject to deterioration by service. Only at the 'breaking point,' at the inner end of the hub of the wheel, are the damaging effects of service usually seen. At this point, the axle, acting as a lever poised on its falcrum, receives shivering shocks from its unyielding burden as it is hurried over an uneven track; and simultaneously the lateral lurches of the car cause the wheel to act as a wrench upon the same point, and, conjointly with these destructive strains, the vibrations of the axle are abruptly suspended at this same point by the wheel, and are thus made to assist the other causes in effecting injury to this part of the axle. Now the question arises, 'Can an axle not be so formed as to be alike durable and safe in all its parts, having no breaking point, no weak point, no crystallizing point, more than at any other point?' If more is required of it at one point than at another, more strength can certainly be given it at that point to meet the demand.

"'The axle and wheels being rigidly joined together, become in effect one article. Now, if we were having an axle and wheels forged in one piece, we would surely avoid the dangerous and damaging angle that is now made at the junction of the inner end of the hub and the axle. We would have a gentle curve formed, tapering towards the tread of the wheel, and also tapering along the axle to its centre, instead of the ruinous angle. Hence, when the axle and the wheel are brought together, they should, as a whole, present as nearly as possible the same rational form. The common practice of forcing the hub up against a shoulder, making what is equivalent to cutting a notch in the axle at that vulnerable point where it needs an enlarged diameter, is simply inviting the axle to break.'

"Any communication relating to this approved steel-clad car-axle will receive prompt attention if addressed to S. C. Emley, New-Orleans, La."

A NEW glazing-putty, known as "thermo-plastic" putty, has been recently introduced into England, and applied to fasten glass into the roofs of railway stations, green-houses, and other structures where iron sashes are employed. This article hardens in a few hours after being used; but when exposed to solar heat sufficient to cause an expansion of the glass and metal, it becomes plastic, and on cooling again hardens to its original firmness, thus obviating the danger of breakage, which is so frequent when ordinary glazier's putty is employed.

THE Baldwin Locomotive-Works have turned out during the past twelve months two hundred and seventy-one complete locomotives, as follows: In October, 1869, 22; in November, 26; in December, 22; in January, 1870, 21; in February, 21; in March, 21; in April, 21; in May, 23; in June, 23; in July, 23; in August, 24; in September, 24. This is certainly a decided progress from the five engines turned out by Mr. Baldwin in 1835.

THE doors of the Eighth avenue street-cars of this city are being furnished with a tin slide, through which the conductor can receive fares from the front platform without chilling or wetting inside passengers by opening the door. An excellent arrangement, and worthy of adoption on all our horse-car lines.

Miscellaneous Items.

HOT BOXES.—Mr. C. Stewart writes as follows to the *Scientific American* concerning the cause of hot boxes on cars: "Journals and the boxes in which they run are but too often neglected, so long as they run without apparent trouble. In many shops a pair of wheels will be placed under a car by (often the case) a carpenter of but little railroad experience, and of no practical knowledge of how a brass should be fitted to the journal, and also without knowing for certain that the packing leathers in the back of the boxes fit the shafts and are oil-tight. One thing is certain, if good Lightner boxes have good, well-fitted brasses, not Babbitt, done by a skillful machinist, with oil-tight leather washers, and if the centres of shafts in each truck in the train be packed with salt, hay, tallow, and oil, they will run on any road for months without heating, and seldom need oiling."

LASSOING A LOCOMOTIVE.—Out on the Union Pacific road, not long ago, a Kickapoo Indian saw a locomotive coming down the track at the rate of forty miles an hour. He thought it was an imported breed of buffalo, and was anxious to secure it, so as to take the prize to the annual exhibition of the Kickapoo Agricultural Society. So he fastened one end of his lasso to his waistbelt, and, when the engine got near enough, he threw the noose nicely over the smoke-stack. Perhaps it is not necessary, but we may as well relate that the locomotive did not stop. The engineer and fireman witnessed the most successful attempt to do the flying trapeze made by any Kickapoo Indian upon the plains since the 1st of last January. There was an aboriginal funeral at the next station when the engine arrived. The grave was not large, for they only buried a small piece of copper-colored meat tied to a string and inclosed in a sardine-box.

RAILWAY SIGNALS.—The following are railway signals: One whistle signifies "Down brakes." Two whistles, "Off brakes." Three whistles, "Back up." Continuous whistles, "Danger." A rapid succession of *short* whistles is the "Cattle Alarm." A sweeping parting of hands on level of the eyes is a signal to "Go ahead." A downward motion of the hand, with extended arms, signifies "Stop." A beckoning motion of one hand means "Back." At night, when a lantern is raised and lowered vertically, it is a signal for "Starting;" when swung at right angles or across the track, "Stop;" swung in a circle, "Back the train." A red flag waved upon the track indicates "Danger;" hoisted at a station, it is a signal for a train to "Stop;" stuck up by the roadside, it is a signal of danger *on the train ahead;* carried unfurled upon a locomotive, it signifies "Engine following," and gives warning that another (special) engine or train will soon come along on the same track.

AN IRON RAILWAY TIE.—A citizen of Michigan has invented an iron railway tie which he thinks will prove a practical substitute for wooden ties. If such shall prove to be the case, very important results will follow. Wooden ties cost about seventy cents each, but require to be replaced every three or four years. The iron tie costs three dollars, and once down is down forever, as it is protected from corrosion by coal-tar. The main feature of the invention, however, is the lock. One flange is cast on the tie. The other is of wrought-iron, and is held in place by a three eighths wrought-iron quarter-round key. The rail rests upon a rubber cushion four inches square and five inches in length. This rubber cushion is protected from the action of the elements by one eighth inch iron cap, made to fit over it closely. It is claimed that this rubber cushion will prevent the beating down of the end of the rails; will, by obviating concussion, save rolling stock, and that the train will glide smoothly, instead of thundering along.

CATTLE-CAR.—A car built on a new principle by J. W. Street & Co., for the transportation of cattle, is described by the *Chicago Railway Review*. The length of the car is thirty-six feet, breadth eight and a half feet, good height, and well ventilated. The inside has adjustable stalls, so arranged as to accommodate cattle of any size—each animal having its own stall. The obvious advantage is, that cattle can be run to any market without having to stop for rest and feed, as each animal has its own feed and water trough, the feed being let down through a funnel from the top, and water being supplied from a small tank attached to the end of the car. The first car of this kind, loaded with sixteen head of cattle, was sent recently over the Pittsburg and Fort Wayne road to Pittsburg.

THE locomotive-works at Schenectady, New-York, are employing more hands than ever before. The same is true of every locomotive-engine maker of whom we have any knowledge. They are all overstocked with orders. The business of railroad-making is more active than ever before, and yet intelligent parties in the iron business some twenty years ago feared that the iron manufacture would soon prove unprofitable by reason of all the railroads required for the business of the country being made. How short-sighted! The result has shown that every mile of new road laid proves the necessity of two more.

THE St. Louis *Dispatch* gives an extended description of the establishment and operations of the Missouri Car and Foundry Company, which gives employment to four hundred men, and turns out six cars per day. The article concludes as follows: The company is composed of the following officers: H. M. Woodward, President; John S. Newberry, Vice-President; Warren Currier, Secretary; William McMillan, Treasurer, and James Thompson, Superintendent. The directors are H. M. Woodward, William McMillan, W. Currier, J. McMillan, J. S. Newberry, E. C. Dean. The three last-named gentlemen reside in Michigan, where a large part of the stock is owned. We are pleased to record the fact that the company is meeting with such marked success.

THE Pullman Palace Car Company last week put on the St. Louis, Terre Haute, and Indianapolis Railroad a new sleeping car, recently manufactured at the Chicago, Burlington, and Quincy shops in Aurora. An Indianapolis paper says of it, "The new beauty's name is the 'China,' and it is without exception the neatest and most tastefully appointed sleeper that has ever before been seen in this 'neck of the woods.' It is well fit to be mate to the 'Arlington,' and the two will alternate in accompanying the train leaving this city at 7.30 in the evening for St. Louis, *via* the great 'Vandalia Short Line.'"

AN ingenious railway-lamp, as we learn from the New-York journals, has been invented in France. It is so constructed that passengers can use it as an alarm signal in the different compartments of the train. It has three signals, one consisting of a brilliant glare of light, and will come in use when danger approaches in a dark night; another is a small flag, which also indicates danger; and the third is a ringing apparatus of great power, extending the length of the train to the guard-room, and indicating the exact compartment whence the alarm proceeds. In all cases, the alarm signal is given by touching a spring knob connecting with the lamp and easy of access.

THE Columbus Car and Car-Wheel Works, J. L. Gill, proprietor, occupy an area of six acres, with one large blacksmith-shop, two erecting-shops, one wood-work and machine-shop, one moulding-foundry, one wheel-foundry, two repoir-shops, offices, and smaller buildings. The capital invested is $300,000, and from eighteen to twenty freight and coal-cars are completed weekly, two hundred workmen being employed. The annual production amounts to $750,000.

A NEW device for catching dust on railroads has been devised by Mr. W. M. K. Thornton, of Rolla, Missouri, and is being tried on a Western road. It is described as a platform suspended under the whole length of each car, a few inches higher than the top of the rail, and connects the platforms under the several cars by means of hinged supplementary pieces, removable at pleasure. Practically one long platform underlies the entire train of cars. The dust rising from the ballast is thus to be effectually shut off, not only from the doors and windows, but even from the journal boxes and bearings of the trucks. The petticoat or curtain arrangement, which prevailed for a while on some roads, and gave great satisfaction to travelers by excluding not only dust but noise, has been abandoned only because it concentrated the dust upon the running gear, making it wear out faster. It will also protect passengers from falling under the wheels.

THE Brotherhood of Locomotive Engineers closed its annual meeting at Nashville, on the 26th instant, the session having been held for a week. About 130 delegates were present, representing railroads in almost every State in the Union. An address of welcome was made by Governor Senter, of Tennessee, which was responded to by Mr. Wilson. Other addresses were made on the part of the city of Nashville and the branch of the brotherhood in Nashville. The grand chief engineer then read his annual address. The next annual convention will be held in Toronto, Canada.

Personal.

MR. S. H. KNIGHT, for about two years past General Superintendent of the North-Missouri Railroad, has resigned. Mr. Knight was formerly Division Superintendent of the Chicago and Alton Railroad. He went to the North-Missouri about the time its line to Kansas City was completed—or rather when the rails were down on that line, for it was very far from being completed. Taking the road as he did when it was hardly fit to be operated at all, he has greatly improved its condition at the same time that he has increased its business and its earnings.

F. E. PERKINS, Esq., formerly Master Mechanic of the Vermont Central Railroad, and more recently Superintendent of the motive power and rolling stock of the Union Pacific Railroad, has received the appointment of Superintendent of the Southern Pacific Railroad.

MR. JOHN HEWITT has been appointed Master Mechanic of the South-Pacific Railroad Company.

LARZ ANDERSON has been elected Vice-President of the Ohio and Mississippi Railway Company in place of A. H. Lewis, deceased. Mr. Anderson is one of the most eminent citizens of Cincinnati.

MR. M. M. MARTIN, the new Assistant General Superintendent of the Ohio and Mississippi Railway, will perform the duties of general purchasing agent and exercise a general supervision of the rolling stock and machinery.

MR. WILLIAM R. ARTHUR, formerly General Superintendent of the Illinois Central Railroad, took charge of the North-Missouri Railroad to-day as its General Superintendent, vice S. H. Knight, resigned.

MR. ADDISON DAY, who has been connected with several railroads in New-York, has taken charge of the St. Louis and Iron Mountain Railroad, as its General Superintendent.

A PATENT has been taken out in England for a hollow iron curb-stone, inside of which telegraph wires may be put, instead of being buried in the earth, as is often done there.

Communication.

More about Hot Boxes.

EDITOR OF THE NATIONAL CAR-BUILDER: In the October number of your paper I notice a communication signed "B. C. M.," in which the writer tells how hot boxes may be produced, and how they may be avoided. He proposes to avoid them by turning off the hub and planing up the back of the box so as to run them against each other, and thus take up the end-play. This plan, it seems to me, would be more expensive than the hot boxes—or, in other words, "the meat wouldn't pay for the mustard." An examination of any wheels with their hubs running against the back of the box will convince any one familiar with the subject that the amount of oil drawn from the box, and wasted by the friction of the hub against the back of the box, is very great. The flying dirt adheres to the oil surfaces, and very soon grinds out the back of the box, creating end-play, making the back packing useless, and a new box necessary. These boxes should last for years; but the operation of the plan recommended by the writer would render necessary their frequent renewal.

Allow me to call attention to what I consider a much better plan than the above for overcoming the evils of too much end-play of the axle; it is this, carry the outer end of the brass bearing half way down over the end of the axle. This overhanging end of the brass is placed where its lubrication and protection from dirt are thoroughly provided for. It can not become misplaced, and is of a better wearing material than the cast-iron back of the box. By means of the arrangement described, the amount of wearing surface to be worn away before the brass can be shortened is more than double the amount to be obtained by any other style of brass, while it also reduces the mean speed of that part of the axle that wears the brass *short* to about one half *less* than it is on any other style of brass. Whenever it is necessary to renew the brass, the end-play is taken up by the new brass. This style of brass is from three to ten times as efficient in mileage as the brasses without the overhang. Its use improves the riding of the car by preventing violent side motions, increases the durability of trucks for the same reason, and decreases the cost of making and applying new brasses in direct proportion to the additional mileage made by them.

FAST TIME AND NO HOT BOXES.

Mechanical and Scientific.

COLORING OF FURNITURE.—Nothing contributes so much to enhance the beauty of a stuff intended for chairs, sofas, etc., as the selection of the wood to which it is attached; and, reciprocally, nothing contributes so much to increase the beauty of the wood as the color of the stuff in juxtaposition with it. We should assort violet or blue stuffs with yellow woods, such as citron, maple, satin-wood, etc. Green stuffs with rose or red-colored woods, as mahogany. Violet or blue-grays are equally good with yellow woods, as green-grays are with the red woods. But in all these assortments, to obtain the best possible effect it is necessary to take into consideration the contrast resulting from height of tone; for a dark blue or violet stuff will not accord so well with yellow wood as a light tone of the same colors; and it is for this reason that yellow does not assort so well with mahogany as with wood of the same color, but not so deep. Among the harmonies of contrast of tone, ebony or rosewood permits its employment with light stuffs to produce contrasts of color. It can also be employed with very brilliant, intense colors—scarlet, aurora, flame color, etc.

TO FIX DRAWINGS AND DESIGNS.—It may be useful to designers and others to know that pencil and chalk drawings can be set by washing them over with water in which isinglass or any colorless size has been dissolved; it may be necessary, after the first coat is dry, to go over it with a second coat. When this wash is perfectly dry, the work may be varnished with one or two coats of a white spirit varnish, or, what is perhaps preferable, a varnish of equal parts of Canada balsam and spirits of turpentine; this last varnish will produce a beautiful gloss, and possesses the advantage of being able to stand washing with soap and water. It will be found necessary to apply the isinglass solution very gently, and not go over any part a second time until the first coat shall be perfectly dry, otherwise the lines of the work may be disturbed. It is also necessary to keep the work from the dust, or particles may adhere to the lines and mar the beauty of the work; care must also be taken to have the brushes perfectly clean.

A TURKISH recipe for a cement used to fasten diamonds and other precious stones to metallic surfaces, and which is said to strongly unite even surfaces of polished steel, although exposed to moisture, is as follows: Dissolve five or six bits of gum mastic, each of the size of a large pea, in as much spirits of wine as will suffice to render it liquid. In another vessel dissolve in brandy as much isinglass, previously softened in water, as will make a two-ounce vial of strong glue, adding two bits of gum ammoniac, which must be rubbed until dissolved. Then mix the whole, with heat. Keep in a vial, closely stopped. When it is to be used, set the vial in boiling water.

A VALUABLE TABLE.—The following table will be found valuable to many of our readers:

A box 24 inches by 16 inches square, and 28 inches deep, will contain a barrel.

A box 26 inches by 15½ inches square, and 8 inches deep, will contain a bushel.

A box 12 inches by 11½ inches square, and 9 inches deep, will contain a half-bushel.

A box 8 inches by 8 inches square, and 8 inches deep, will contain a peck.

A box 8 inches by 8 inches square, and 4⅛ inches deep, will contain one gallon.

A box 7 inches by 8 inches square, and 4⅛ inches deep, will contain a half-gallon.

A box 4 inches by 4 inches square, and 4¼ inches deep, will contain a pint.

GOLD-LEAF.—To prepare a book of leaf for use out of doors, take a large pair of scissors and cut the back of the book right off as near the sewing as convenient. Then take up the top leaf of paper and rub the side that was next the gold on the face or hair; lay it down again on its leaf gold; pass the hand over it smoothly and with one moderate pressure, and the gold will be found to adhere sufficiently; then lay it aside, gold side up; do the same with the next leaf, and so on through the book. In applying the leaf so prepared, cut paper and leaf together with the scissors, and apply to the work, holding the piece with the points of the scissors at any corner. In this process no gilder's cushion, tip, or knife is required, only a little cotton wool to press down the gold on the work.

RUBBING-STONE.—English rubbing-stone admits of economy in rubbing down cracked work and rough stuff. The advantage in preference to pumice-stone is that it does not clog, and it wears a longer time, besides which it is uniform throughout, and free from pebbles or flint. Consumers should note that the grain ought to be cut across, and not lengthwise, and it must be kept in a damp place, else it will become hard. When hard, it may be softened by being placed in water for a day or two; but in such case it must be used at once, else, if taken from the water, and left to dry, it will become harder than before, and will be fit only for powdering.

Facetiæ.

A KANSAS girl was standing, hand in hand with her lover, with eyes and mouth agape, watching the incoming of the first train on a new railroad. The locomotive was quiet until it came into the depot; but when the whistle blew, as the engine was stopping, the girl burst out with the exclamation, "*Why, dog my cat, if she didn't come plum into the shanty afore she bellered!*"

AN Irishman decapitated a turtle, and afterward was amusing himself by putting sticks into its mouth, which it bit with violence. A lady, who saw the proceeding, exclaimed, "Why, Pat, I thought the turtle was dead?" "So it is, ma'am; but the crather's insensible of it."

THEY have some smart business men in New-Jersey. Last summer a young man in a field near Trenton was struck and killed by lightning, and when the people began to flock to the place to look at the victim, they found a man standing by the corpse trying to sell lightning-rods!

A TAILOR sent in his bill for clothing to the editor of a literary magazine, who returned it with a note saying that the manuscript was respectfully declined.

AN incorrigible loafer, being taken to task for his laziness, remarked, "I tell you, gentlemen, you are mistaken. I've not got a lazy bone in my body; but the fact is, *I was born tired.*"

SOME things that a man can't do: make a round triangle; lift himself off the ground by his boot-straps; make pork out of pig-iron; jump across a ditch at two jumps, and crawl down his own throat.

WHAT did the cat say when it looked through the window of Noah's ark, and saw dry land? *Is that are a rat?*

JOE MEEK, the Oregon trapper, went to Washington as a territorial messenger. His good looks and relationship to President Polk made him a great favorite with the ladies. While promenading one evening, a lady inquired whether he had been married. "Yes," Joe said, "he had a wife and six children." "O la!" continued his friend, "and isn't Mrs. Meek afraid of the Indians?" "Afraid of the Indians?" replied the frontiersman; "I reckon not! Why, she's an Indian herself!"

CHICAGO has a hotel with a patent heat-indicator, running from every room to the office, so the clerk can tell at a glance how hot it is in any room in the house. They had a woman's-rights meeting in one of the parlors the other day, when all of a sudden the indicator said, "Red hot;" and the firemen had a hose in that parlor in twenty-eight seconds, and put 'em out.

AN individual who was puzzled to know where all the Smiths came from has at last solved the mystery. At Waterbury, Ct., on the door of a factory appears a sign inscribed, "Smith Manufacturing Company."

"WHEN the earthquake took place," said a husband to his wife, "I felt my heart beat so that I was frightened." "Yes," replied the dear creature, "it takes an earthquake to make your heart beat." And this couple have celebrated their silver wedding.

Locomotive Builders.

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Danforth & Cooke	Paterson, N. J.
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Hinckley & Williams	Boston, Mass.
Manchester Locomotive Works	Manchester, N. H.
Mason, William	Taunton, Mass.
McKay Iron and Locomotive Works	Jersey City, N. J.
Portland Company	Portland, Me.
Pittsburg Locomotive Works	Pittsburg, Pa.
Rogers Locomotive Works	Paterson, N. J.
Rhode Island Locomotive Works	Providence, R. I.
Schenectady Locomotive Works	Schenectady, N. Y.
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Boston & Maine		D. C. Richardson	Lawrence, Mass.
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Blossburg & Corning	O. C. Patchell	O. C. Patchell	Corning, N. Y.
Brockville & Ottawa	Joseph Cockfield	Joseph Cockfield	Brockville, Can.
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Chicago & N. W. Iowa Division	C. C. Elliott	William Campbell Clinton, Iowa.	
Chicago & N. W. Peninsula Division	S. L. Pierce		Escanaba.
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Contoocook River			Concord, N. H.
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Dayton & Michigan	William Cullen,	W. H. Allison	Cincinnatti, Ohio.
Delaware, Lackawanna & Western	Walter Dawson	Robert McKenna	Scranton, Pa.
Des Moines Valley	Morris Sellers	R. E. Smith	Keokuk, Iowa.
Detroit & Milwaukee	B. Briscoe	B. Briscoe	Detroit, Mich.
Delaware & Hudson Canal Co	James Dickson	Thomas Orchard	Carbondale, Pa.
Dorchester & Delaware			Cambridge, Md.
Dubuque South-western	J. M. Williamson	J. M. Williamson	Farley, Iowa.
Dutchess & Columbia			Washington, N. Y.
E			
Eastern		J. P. Somerby	Salem, Mass.
Eastern	John Thompson		East-Boston, Mass.
East-Tennessee & Virginia	Jos. Armbruster	Jos. Armbruster	Knoxville, Tenn.
East-Tennessee & Georgia	Eli Hixon		Knoxville, Tenn.
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Evansville & Crawfordsville	John L. White	A. Sharra (fore'n)	Evansville, Ind.
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Housatonic	C. R. Morris	J. Ferris	Bridgeport, Ct.
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Houston Tap & Brazoria	A. Malsch	R. H. Yeomans	Houston, Texas.
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Indianapolis, Peru & Chicago	John McKenna	John McKenna	Peru, Ind.
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Iowa & Missouri State Line			Farmington, Iowa.
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Lehigh Valley	J. Kinsey		South-Easton, Pa.
Lehigh Valley	P. Hofecker	E. R. Brown	Weatherly, Pa.
Lehigh Valley	A. Mitchell	Mauch Chunk, Pa.	Delano, Pa.
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Lehigh & Susquehanna	Wm. H. Brown		Mauch Chunk, Pa.
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Lewy's Island	C. W. Button	Damase Merceir	Milltown, Maine.
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Lebanon Springs			Burlington, Vt.
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London & Port Stanley			London, C. W.
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Macon & Brunswick	M. Thornton	M. Thornton	Macon, Ga
Maysville & Lexington			Maysville, Ky.
Marietta & Cincinnati	E. Bosley	E. Bosley	Chillicothe, Ohio.
Memphis, Clarksville & Louisville			Clarksville, Tenn.
Memphis & Little Rock	D. R. Wing		Little Rock, Ark.
Memphis & Charleston	Michael Burk	A. W. Drew	Memphis, Tenn.
Memphis & Charleston	L. M. Sellars.	Thomas Varun	Huntsville, Ala.
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Mississippi, Gains. & Tus			Gainsville, Ala.
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Milwaukee & St. Paul		John Baillie	Milwaukee, Wis.
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Mobile & Montgomery	James McFarland	L. Barham	Montgomery, Ala.
Mobile & Girard	William Eyles	A. J. Nix	Girard, Ala.
Mobile & Ohio	G. D. Linning	John McHugh	Mobile, Ala.
Missouri River, Fort Scott & Gulf	John McCrumm		Kansas City, Mo.
N			
Nashville & Chattanooga	John U. Eastman	J. G. Sawyer	Nashville, Tenn.
Nashville & Decatur	C. B. Knowles	C. B. Knowles	Nashville, Tenn.
New-Bedford & Taunton	Robert Chase	Robert Chase	New-Bedford, Mass.
New-Canaan			New-Canaan, Ct.
New-Brunswick & Canada	T. Armstrong	T. Armstrong	SaintAndrew's N.B.
New-Haven & Northampton	Henry Fox	Henry Fox	Westfield, Mass.
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New-York & Harlem	Wm. M. Strong	Leander Garey	New-York.
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New-York Central	G. B. Van Vorst		Albany, N. Y.
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* Mechanical Superintendent.
† General Master Mechanic. ‡ General Master Mechanic and Master Car-Builder.

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New-York Central		Wm. Johnson	Buffalo.
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New-York & New-Haven	H. Kittendorf	M. C. Andrews	New-Haven, Ct.
New-London Northern	J. W. Dow	George Boyden	New-London, Ct.
New-Jersey & Transportation Co	John Headden	David H. Baker	Jersey City, N. J.
New-Haven & Derby			New-Haven, Ct.
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New-Lisbon			Leetonia, Ohio.
New-Orleans & Ohio	John R. Jordan	John R. Jordan	Paducah, Ky.
New-Orleans, Jackson & Gt. Northern	John Conlon	Charles Bartine	New-Orleans, La.
New-Haven, Hartford & Springfield			Hartford, Ct.
Naugatuck	R. Post	George W. Gray	Bridgeport, Ct.
Newark & Bloomfield	Luke F. Tronson		Hoboken, N. J.
Nova Scotia	W. Johnson		Bedford, N. S.
North-Missouri	Edmund Taylor	C. S. Buck	St. Louis, Mo.
North-Carolina	E. Burns	B. G. Sergeant	Co. Shops, N. C.
New-Orleans, Mobile & Chattanooga	George Shattuck	George Shattuck	
Northern Central	C. M. Lewis		Baltimore, Md.
Northern Central		G. W. Demarest	York, Pa.
North-Lebanon		Henry B. Oves	Lebanon, Pa.
North-Pennsylvania	Franklin Roop	Franklin Roop	Philadelphia, Pa.
North-Eastern	D. W. Haines	A. M. Corrie	Florence, S. C.
Northern	James W. Lander	Albert Langmaid	Concord, N. H.
Northern of New-Jersey	T. W. Demarest		New-York.
Norwich & Worcester	Richard Colburn	G. R. Bentley	Norwich, Ct.
Northern of Canada	James W. Forster		Toronto, Can.
Norfolk & Petersburg	J. S. Whitworth	J. S. Whitworth	Norfolk, Va.

O

Ogdensburg & Lake Champlain	William A. Short		Ogdensburg, N. Y.
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Ohio & Mississippi	George W. Harris	M. M. Martin	Cochran Shops, Ind.
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Oil City & Pithole	George Thompson		Pithole, Pa.
Oil Creek & Alleghany River	J. S. McElroy	Jacob Williams	Corry, Pa.
Oil Creek & Alleghany		H.J.Bookhammer	Oil City, Pa.

P

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Pacific of Missouri	Jacob Johann	Jacob Johann	St. Louis, Mo.
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Philadelphia & Reading	John Wootten	Aaron Steinbach	Reading, Pa.
Philadelphia, Germ'n & Norris'n	John Moyer	Nathan Pawling	Philadelphia, Pa.
Philadelphia & Baltimore Central	S. D. Danfield	SamuelD. Danfield	Chester, Pa.
Pittsburg, Cincinnati & St. Louis	Luther R. Wallace	James Ball	Logansport, Ind.
	Robert Curtis	Theo. Chamberlain	Columbus, Ohio.
	Thomas Denmead		Dennison, Ohio.
	Thomas V. Losee	John Gottschall	Indianapolis, Ind.
		James McGee	Steubenville, Ohio.
Pittsburg, Fort Wayne & Chicago	S. M. Cummings	John Marquis	Alleghany, Pa.
Pittsburg, Fort Wayne & Chicago	J. M. Boon	Wm. Waddington	Fort Wayne, Ind.
Pittsburg & Connellsville	D. P. Rennie	J. M. Rutter	Connellsville, Pa.
Peoria, Pekin & Jacksonville	Henry A. Little	Henry A. Little	Pekin, Ill.
Peninsular			Battle Creek, Mich.
Portland & Rochester	Jas. S. Drake	Samuel Dean	Portland, Me.
Portland & Kennebec	John Ellis	J. W. Trussel	Augusta, Me.
Portland & Oxford Central	Geo. W. Battles	Geo. W. Battles	Buckfield, Me.
Portland, Saco & Portsmouth	John Donnell		Portland, Me.
Port Royal			Beaufort, S. C.
Port Hope, Lindsay & Beaverton	H. G. Taylor	H. G. Taylor	Port Hope, Can.
Port Huron & Lake Michigan			Port Huron, Mich.
Providence, Warren & Bristol	Rufus Smith	J. Brightman	Bristol, R. I.
Portsmouth, Gt. Falls & Monmouth	James Tucker	E. Fall	Union Village, N.H.
Petersburg	R. B. Adams	Alex. Wright	Petersburg, Va.
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R

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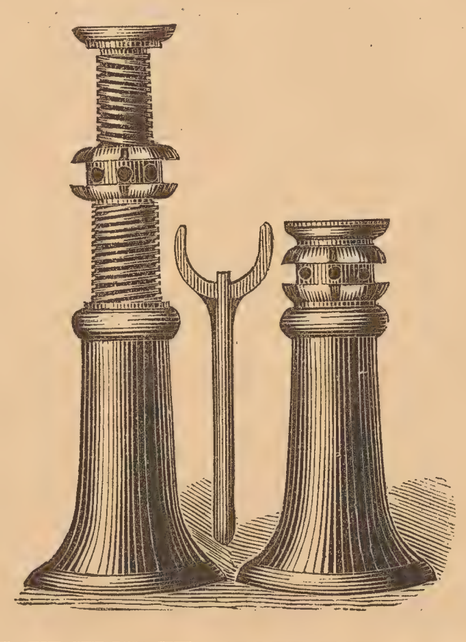

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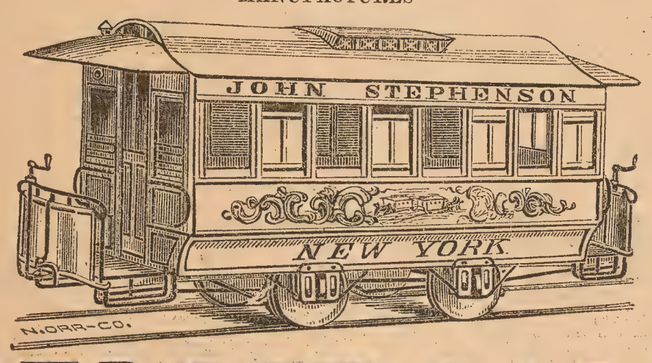

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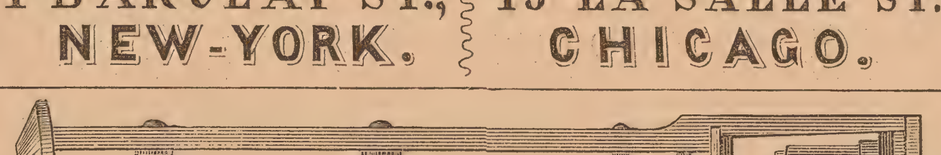

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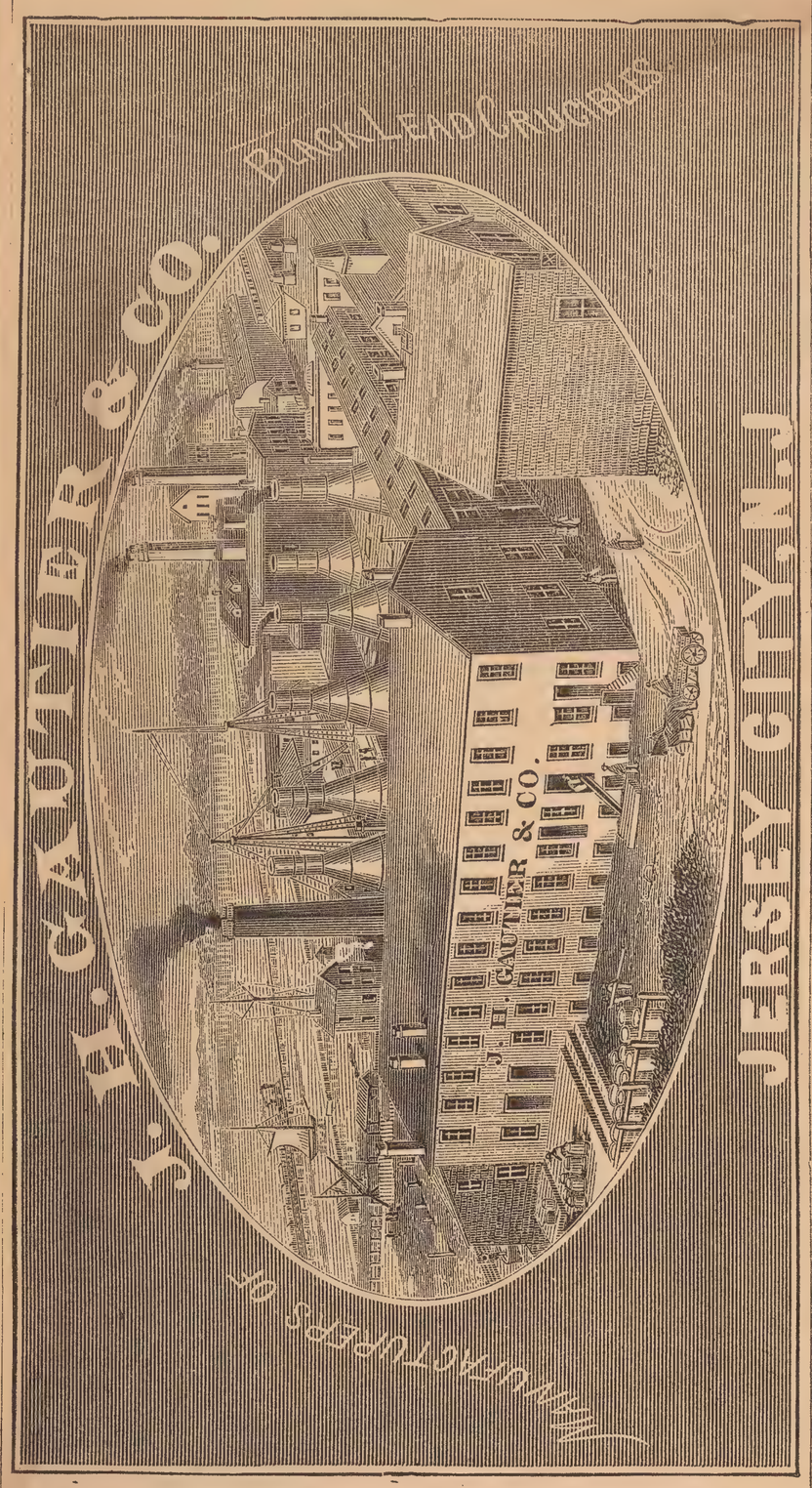

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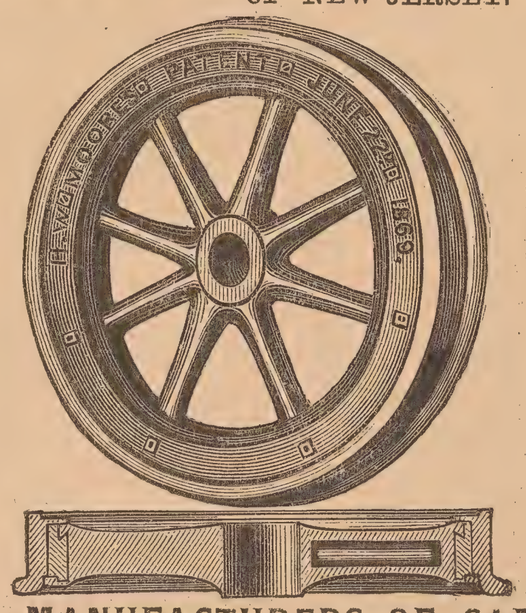

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THE NATIONAL CAR BUILDER.

DEVOTED TO THE INTERESTS OF RAILWAY ROLLING STOCK.

Vol. 1. No. 7. } JANUARY, 1871. { 50 Cents per Annum. Single Copies, 10 Cents.

STEEL-MAKING IN FRANCE.

Description of the Establishments of Hte. Petin, Gaudet & Cie.

THE works of this company are distributed among several establishments, each having its specialty, and comprising between them all the branches appertaining to the manufacture of iron; mines, blast-furnaces for wood and coke, forges, steel manufactories, and workshops for adjusting and mounting. We shall briefly pass in review the peculiar products of these establishments.

MINES OF ST. LEON, ISLE OF SARDINIA.

The bed of the oxidized iron of St. Leon lies about twelve and a half miles to the west of the city of Cagliari, in the midst of the mountainous elevation, closed in and bounded by the following points, designated on the map of General La Marmora by the names of Monte Arcosu, Sa Concale, Santa Lucia, the village of Capoterra, Santa Barbara, Monte Casteldarris and Monte Latie. Its geological position is in a silurian region in the vicinity of granitic uprisings.

This bed of ore is a flat vein of stratification, perfectly well defined; its direction is from south-east to north-west, and its inclination varies from thirty to forty degrees. It can be followed for more than a halt a mile in extent; the size of the vein varying from 32 feet to 40 feet. This magnificent bed of ore is worked partly under the open sky and partly in large galleries, measuring 32 feet in breadth by 40 feet in height, following the direction of the vein, cut up among themselves by inclined galleries and separated by massive piers of 32 feet.

The mine was discovered in 1862. At the present day it yields at the rate of 100,000 tons of ore yearly, a figure which will soon be doubled. The chief points of extraction are nearly eighteen hundred feet above the level of the sea, and within nine and a half miles of the little port of Maddalena, situated on the Gulf of Cagliari

The working of the mine is facilitated by three large planes, having an inclination of about forty-five degrees, reducing the elevation by about 1400 feet, which planes are provided with machinery for lowering the ore, made of iron wire cables, and by means of which the ore is brought to the railroad station. The railway, which is nine and a half miles in extent, has a mean inclination of .36 of a foot, which still further lessens the vertical height by 443 feet; on it are placed small locomotives, each of which can descend 150 tons per day.

A telegraph, connecting the various stations, forestalls and prevents all chance of accident.

This railroad, laid as it is in a very hilly district, and the building of which has required many artificial erections, abuts on a pier running out into the sea to a distance of 656 feet, constructed in the gulf, on which lies the port of Maddalena.

The above is a complete view of the important labors it was necessary to perform before the working of the mines of St. Leon could be carried on, on a large scale. The defect in the means of communication, the want of provisions and victualing, the absence of a laboring population, have been so many obstacles which had to be overcome in a country deprived of and wanting all industrial resources. A village had to be built to receive and shelter the workmen, summoned from France and Piedmont; stores established, from which provisions and articles of consumption were distributed at cost price, and to day 500 working-men live and prosper in a part of Sardinia which until then had been completely abandoned.

The ore, which is of an excellent quality, furnishes an iron eminently suited to the manufacture of steel.

Among the many analyses that have been made, the following presents most exactly the average results which have been obtained:

Protoxide of Iron,	24.00	
(Peroxide of Iron)	62.00	
Oxide of Manganese,	0.80	
Lime,	traces	100
Magnesia,	"	
Sulphur,	0.20	
Phosphorus,	0.00	
Silicate	13.00	

Three foundries provide the iron necessary for the forges—namely, those of Toga, Clavieres, and Givors.

THE WORKS OF TOGA, NEAR BASTIA, CORSICA.

This establishment, located at a distance of half a mile from Bastia, and a few hundred yards only from the vast port which the government is constructing there, is admirably situated, as far as supplies are concerned. In a few hours it can receive its charcoal, which it draws from various parts of Corsica and Sardinia, whose forests are numerous, abounding in hard woods (green oak) which are particularly adapted for carbonization.

It is equally well situated for the receipt of ore coming from different localities on the Mediterranean—as the Island of Elba, Spain, and Algiers, and particularly from the mine of St. Leon, which more especially contributes to its consummation.

The works at Toga comprise four blast-furnaces for wood, six refinery fires, ovens for roasting the ore, and immense bins, capable of holding 10,000 tons of coal. Three furnaces are continually in progress, and produce an average of 28,000 tons of pig-iron per annum. The pig-iron obtained from the ore of St. Leon has, for several years past, produced both iron and steel of a perfect quality, and given to the forges of St. Chamond an incontestable superiority in the manufacture of armor-plates, tires, rings for cannons. etc., etc.,

Six hundred workmen are employed at Toga.

THE WORKS AT CLAVIERES, INDRE.

Clavieres, near 'Chateauroux, in the Berri, has always sustained the reputation for charcoal iron long ago acquired by this ancient forge of the centre of France.

Thus, although the pig-iron of this place has not been able to follow the general reduction which has taken place in the trade, the products coming from this locality are still classed and preserved for those uses which more particularly exact and require iron of a ductile and malleable character.

The establishment consists of two furnaces, eight refinery fires, and a foundry. The ore used is pisciform, and found in the vicinity of Chateauroux.

Clavieres employs 200 workmen.

THE WORKS AT GIVORS, RHONE.

This establishment, concurrently with that at Toga, uses the ore of St. Leon. Placed as it is on the Rhone, and on the railroad, it can draw by either of these highways the fuel necessary to feed its furnaces.

The 35,000 tons of iron which its three furnaces yield, afford a product of varied qualities. Thus, Givors provides the forges of St. Chamond with iron for puddling, moulding, and casting of the most remarkable durability; it furnishes our steel foundries with all the blooms employed in the Bessemer process; and since 1863 this establishment has produced specular iron, similar to that of Westphalia, and destined to be used instead of Spiegel Eisen, which terminates the Bessemer process.

These works employ 250 workmen, and one Bessemer and furnace converter.

THE WORKS OF ST. CHAMOND, LOIRE.

These vast establishments comprise puddling and rolling-mills for every variety of iron or steel, as well as machine-shops for all kinds of manufactures; sixty puddling-furnaces and forty heating-furnaces feed

4 puddling trains;

3 large mills for rolling steel rails, angles, and iron work of every pattern;

1 medium mill;

2 trains for plates;

1 train for armor-plate;

1 train for large iron I beams, produced of all heights at a single rolling. This process is peculiar, and patented by us;

3 trains for locomotive and other tires, and cylindrical trunnion-rings;

2 trains for solid wheels.

All these rolling-mills, and the divers machinery accessory thereto, are worked by steam-engines erected at the works, the effective strength of which amounts to 3000 horse-power.

All the steam-engines, trip-hammers, and other machinery employed in the various establishments of the company are constructed in machine-shops which form part of the works of St. Chamond.

Here also are manufactured the divers articles which we furnish to the trade and to the various governments—such as mounted axles for railroads, straight or cranked shafts and axles, plates for ships, cannon, trunnion-rings, etc., etc.

An immense foundry, annexed to this workshop, contains furnaces, trenches, and cranes by means of which pieces of the weight of 50 tons are cast and removed.

3000 workmen are engaged at St. Chamond.

THE WORKS AT RIVE-DE-GIER, LOIRE.

We have just stated that all the work done with the rolling-mills was prepared at St. Chamond; while that which requires the labor of the large trip-hammers is forged at Rive-de-Gier. Sixteen hammers, the largest of which weighs 15 tons, are at work night and day at this establishment. They are at present putting up a seventeenth hammer, which will weigh 25 tons, and will be principally employed in the forging of cast-steel cannon. From the manner in which the ingots used in the preparation of these pieces are manufactured, the weight of this hammer will fully suffice for the forging of the largest cannon, whose weight when finished will amount to 25 and 30 tons. One of the main difficulties encountered in the erection of hammers of large dimensions was in the casting and in the transportation of iron anvils of large weight. We obviated this double inconvenience by constructing the anvils of a series of plates, intersecting each other, securing thus extreme facility for placing them, and complete solidity when in position.

We will here mention, from among the productions figuring in our exposition, the following pieces which are represented by wooden models one-fifth in size as having been forged in the workshop of Rive-de-Gier.

1855—Shafts with 6 bends, weighing 25 tons, for the Eylau.

" Shafts with 2 bends, weighing 22 tons, for the Indus.

1863—Shafts with 3 bends, weighing 21 tons, for the Magnanime.

" Shafts with 4 bends, weighing 11 1–2 tons, for the Messageries Impériales.

1866—Shafts with 2 bends, weighing 14 tons, for the Compagnie General Transatlantique.

There are 450 workmen attached to this establishment.

THE WORKS AT ASSAILLY, LOIRE.

The manufacture of steel, localized at this establishment, comprises:

1 steel furnace, partly using pitcoal and partly coke, with 1500 crucibles, and capable of melting 45 tons at a time;

2 Bessemer converters, of 7 tons each, and a third of 9 tons;

A shop for steel moulding;

A special workshop for the manufacture of railroad springs of all patterns:

25 ovens for cementation;

A train for steel plates;

3 trains for rolling;

100 trip-hammers, and several smaller hammers used for rough-hewing and in finishing steel work of all dimensions;

The majority of the work done at this establishment consists of ingots for bullets, rails, sheets, and steel tires;

Gun-barrels, breeches, and other pieces required in the manufacture of fire-arms;

Thin sheets for cuirasses, blades, and scabbards for swords or sabres, bayonets, etc.;

Shot for guns of heavy calibre.

The manufacture of these last is only of recent date at Assailly.

So far only 26 guns have been delivered to the French navy—their weight varying from 6 to 16 tons—and 5 guns, weighing 8 1–4 tons, to the Italian navy.

But at the present day, when all the experimental trials have been made, and in view of the successful results obtained, and with the means at our command, we shall be able to respond to all orders. We will further mention the cast and refined steel required by the trade: steel for razors and cutlery—steel for tools and hardware—and lastly, steel for mint dies, which have acquired an incontestable reputation, etc. The establishment at Assailly employs 600 horse-power and 1500 workmen.

In closing the enumeration of the various establishments of the company, we must not forget to mention the coal-mine of "Unieux" and "Fraisse," which is but beginning to be worked, and the iron-mine of "Ougney," (Jura;) at these two mines 200 workmen are engaged. In short, the different workshops of the association of Hte. Petin, Gaudet & Co. employ a steam power of 600 horses, and furnish employment for a working population of 6000 men. Aid funds are established at each place, to which the company adds a sum equivalent to the amount contributed by the workmen. This endowment constitutes a sort of special fund for the procuring of gratuitous medical attendance for the sick and wounded, or for the relief of those misfortunes for which the aid fund could not sufficiently provide. The annual production reaches an aggregate of fifty thousand tons of iron or steel, representing a grand total of from $6,000,000 to $7,000,000 in gold.

Pneumatic Passenger-Cars in Chicago.

A TRIP on a new line of pneumatic cars was taken by seventy invited guests in Chicago, on November 19th. The *Times*, of that city, describes the scene:

"The party left the dummy station at three o'clock, and soon arrived at Hyde Park, where the pneumatic car was found backed up to a portable engine at the rear of the depot. The car resembles an ordinary street-car, excepting the peculiar formation of the roof, which looks like that of a palace sleeping-car, and on this account it was at once dubbed 'the palace street-car' by the visitors. This heavy top renders the car about twice as heavy as others, and is of great importance to the pneumatic car, for it contains the propelling power. It consists of four hollow tanks, made of copper, brazed together, and of sufficient capacity to hold one hundred and fifty cubic feet of compressed air, and of sufficient strength to resist a pressure of two hundred and sixty pounds to the square inch. These tanks are filled, or charged, by means of an air force-pump worked by a steam-engine. Beneath the seats, on either side, at one end of the car, are two small machines operated precisely the same as the ordinary steam-engine, connected with the wheels by cranks. The engines are controlled by the conductor on the platform by means of a wheel placed in juxtaposition with the brake. One hand is used in operating the engine, without interfering seriously with the control of the brakes.

"After the filling of the tanks, which occupied but a few minutes, the company was divided into two parties to accommodate the size of the car. The first load consisted of thirty men. The car started with about the same celerity as one would drawn by a pair of horses, and bowled along very nicely at the rate of six miles an hour. The pressure on the gauge at starting was one hundred and seventy-five pounds. After passing up the track for a mile, the car returned, making the last mile in a few seconds less than ten minutes, and the gauge indicated that only thirty pounds of pressure had been used.

"The car was reloaded, and went another mile and one quarter, when the pressure became exhausted. The tanks were only calculated to hold sufficient air to propel the car three miles. The trial was pronounced to be entirely satisfactory by the railroad men present, and some of them were quite enthusiastic in their praise of the invention and the inventor. The only objection made was the slight noise of the exhaust in the little engines, and this, it is claimed, can be completely deadened by having them inclosed in boxes."

Wanted—An Invention.

ANY person who is unfortunate enough to be obliged to travel at this season of the year could bear testimony to the fact that the usual manner of heating cars is a disgrace to modern civilization and a stigma on the intelligence of car-builders. Not only is there no provision to supply an adequate amount of fresh air, but, owing to the careless or stupid way in which the stoves are often managed, the temperature in the car varies so much that passengers are alternately chilled until their teeth chatter, and then heated almost beyond the point of human endurance.

The process is usually this: the fires are allowed to go down so low that some of the passengers complain of the cold to the person whose duty it is to attend to the stoves. Usually the only idea which persons filling that position seem to have of the object of ventilators to cars is, that they are intended to allow the heat to escape when it is too warm, and if it is too cold they should of course be closed. Whenever, therefore, complaint is made of the cold, the first thing which is done is to close up every aperture through which fresh air can enter or escape, and then make as big a fire as possible. The result, if it has not been experienced, can perhaps be faintly imagined. The atmosphere of the car gradually grows hotter and more stifling, and then more stifling and hotter, until perhaps some courageous sufferer will rebel and insist on having the windows or ventilators opened, and the draught of the stove closed. The car is thus cooled down to a temperature of chilliness, and the whole process is again repeated.

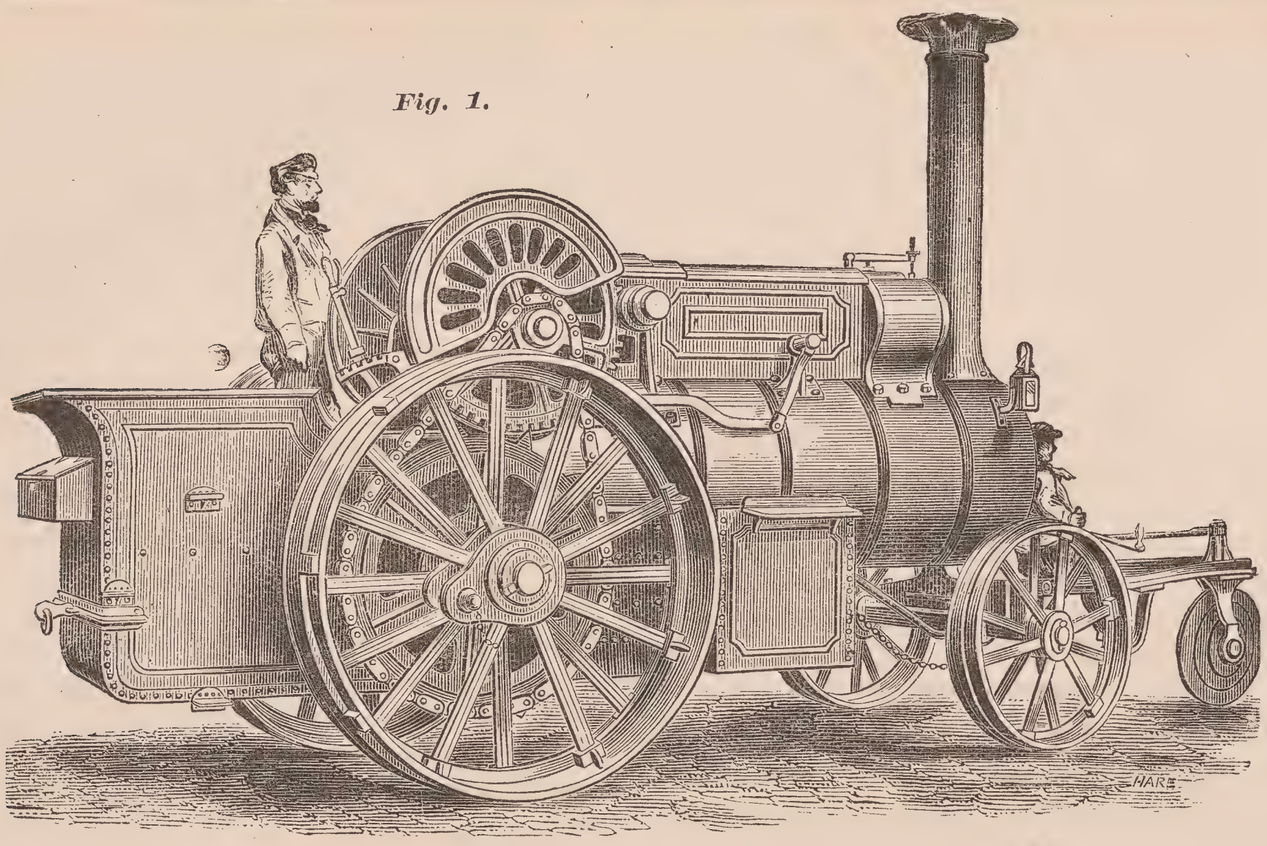
What is needed is a maximum and minimum thermometer of some kind which will show the highest and lowest temperature to which passengers are subjected during each trip. The instrument should be arranged so that its index, of whatever form it may be, can be locked up and be out of the reach of the persons in charge of the stoves. The thermometer should record in some way the highest and the lowest temperature of the car. If it was examined at the end of each trip, and the brakeman or person who attended to the stoves were called to account for his carelessness, it would secure some sort of consideration for the comfort of passengers. Not only would it be necessary for him to give more attention to regulating the fires, but he would also be obliged to look after the ventilators and see that they were not all closed, otherwise the car would get too hot and his thermometer would make a record of it.

A word of caution to inventors. A contrivance of the kind we have suggested must be simple and should be cheap. An ordinary maximum thermometer would hardly answer, because the jar of the car would move the recording attachment. Some other device must be used, and if it could be arranged so as to be seen of all men in the car, it would serve a good purpose. All complicated traps should be avoided, and inventors should thoroughly test what they design before they recommend it.—*Chicago Railroad Gazette.*

SCARCITY OF TENPENNIES.—According to the Boston *Commercial Bulletin*, there is but one nail company in New-England now running on full time, and the demand for present use is greater than the supply, and consumers are obliged to take only a hand-to-mouth stock. There has not been an extra nail machine put into any of the mills for fifteen years in New-England, and only one is run by steam, the rest all being dependent on water-power, of which, at present, there is a deficiency.

LIQUID GLUE.—Fill a bottle about three parts full with broken glue, then add good whisky sufficient to cover it about half an inch, cork tight and set in a warm place; shake occasionally. It will take a few days to dissolve thoroughly, and it may be necessary to add more whisky to reduce it to a proper thinness. This glue is always ready for use, even in the coldest weather, does not require heating, and for durability is far superior to glue mixed with water.

Fig. 1.

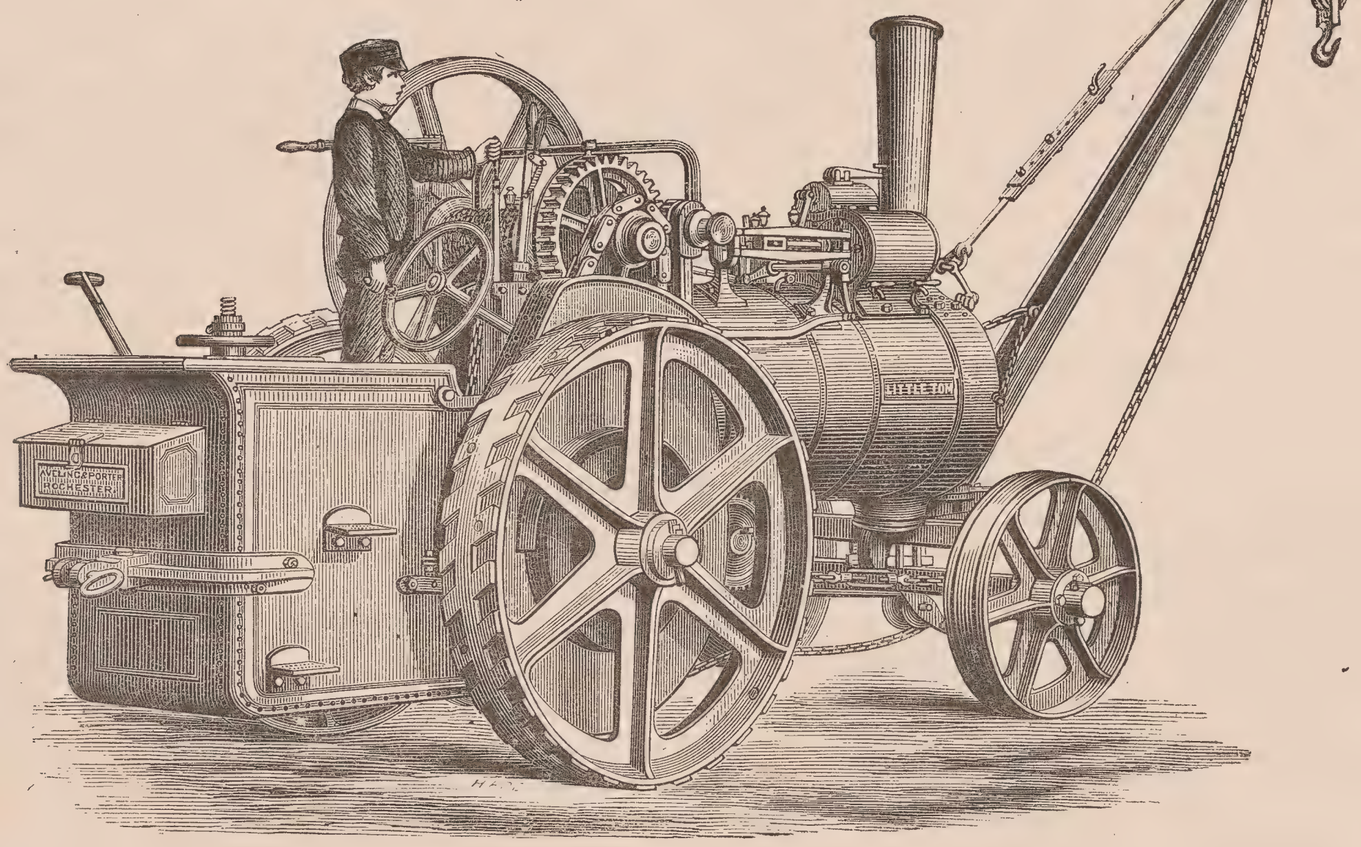


Aveling & Porter's Road Locomotive.

THE accompanying engravings illustrate the traction engine apparatus of Aveling & Porter, the utility of which has been tested abroad, and especially in England, where some five hundred of these locomotives are in actual operation. It is probable that they will ere long be introduced, under certain modifications suited to the conditions incident to their employment, in this country. Fig. 1 represents the locomotive used for ordinary tractive purposes, and Fig. 2 the same employed as a self-propelling crane. These steamers are used abroad not only for general traffic along ordinary roads, the conveyance of farm produce, and the like, but also for all descriptions of work to which a steam-engine can be applied; a balance-wheel suitably arranged for a driving-belt adapting each machine for the uses of a stationary motor, while the addition of a clip-drum fits it for steam plowing by the rope traction, or a most successful English system. The engines are made from six to twenty horse-power, and are arranged to burn either wood or coal for fuel. They travel easily up grades of 1 in 9, and a powerful brake is attached to the engine for use in descending hills. An eight horse-power engine, costing $3500, (gold,) is guaranteed to take 15 tons of 2240 lbs. per ton (exclusive of the engine) up an incline of 1 in 12, and 25 tons on a level, at from three to five miles per hour on moderately good roads. This, it will be seen, is three tons more on a level, and seven tons more on the grade of 1 in 12, than is claimed as the maximum of the Thompson steamer of the same nominal horse-power, and costing with packing and the adjuncts for other than tractive purposes say $5500 against about $4000, the cost of the Aveling & Porter.

With reference to the construction of the locomotive, it is arranged with double gearing, to travel at two speeds—1 to 2½, and 3 to 5 miles per hour. The cylinder is placed on the forward part of the boiler, and is surrounded with a steam-jacket in direct communication with it; the steam is taken into the cylinder through the dome formed in this jacket. Priming in steep ascents is consequently prevented, the use of steam-pipes either inside or outside the boiler is avoided, and an important saving in fuel is effected. Single-cylinder engines, and reversing gear when connected to the driving-wheel by means of Aveling's patent chain-gear, are claimed to have proved themselves thoroughly efficient, more powerful, less complicated, and in every respect better adapted for general traction purposes than engines with double cylinders. The tanks carry a sufficiency of water for a run of six or ten miles, according to the nature of the road, and the coal-bunker holds a day's supply. Either of the driving-wheels can be rotated at pleasure when turning sharp curves, and there is a patent arrangement for steering the engine, very efficient and simple, and comprising a fifth steering-wheel in front, or rather a thin disk of 2½ feet diameter, which acts on the road by its own weight and by that of a triangular frame, fixed by means of a horizontal joint on the front part of the engine. The weight of all this apparatus is 6 cwt. 1 qr. 16 lbs only. This fifth wheel can not exercise any injurious action upon the ground; but slight as the friction is, it is sufficient for moving the fore carriage which carries it, guided by the hand of the steerer, and by a very slight effort, in any required direction.

Fig. 2.



The relative cost of steam and of horse power for hauling or freight purposes must vary so much with the condition of the roads, and the extent to which the one or the other may be applied to agricultural or other purposes aside from those of traction, that no definite data can perhaps be given. An estimate founded upon careful English experiments, and approximately correct, shows that the cost per day of hauling (the wagons returning empty) 12 tons 10 miles, by horse power, amounts to $21.90, while the cost of the same by steam power is only $11.89, showing a difference in favor of steam of $10.01, or $3686.50, for one year.

These results are somewhat surprising in the advantage shown in favor of the road-steamer, and their magnitude is doubtless due to the average superiority of English as compared with American roads, the latter requiring to a greater or less extent the ameliorating action of the steam road-roller before the best or most profitable results of traction engines can be realized upon them.

New-Haven Car Company.

THIS extensive establishment was started but a few years ago, with a limited capital, and but few conveniences for a successful competition with more extensive works of the kind in other parts of the country.

During the time they have been in operation, they have manufactured some of the finest cars now made, which are already running on many of the first roads in the country. On entering the factory, the first thing that attracts the attention is a splendid passenger-coach designed for the New-Haven, Middletown, and Willimantic Railroad. This car is finished inside with shell-maple, tulip-wood, and black-walnut, with a rack-panel of birdseye-maple. The seats are G. Buntin's patent iron seat, with silver-plated arm-rest, trimmed with maroon-colored plush inside and green plush outside. The frescoing over head is very elaborate, and the lamps are of unique design. The cars are also furnished with Muller's self-coupler, so that there is no danger of being injured in coupling the cars. One of these elegant cars was placed on the Air Line Road on Monday, and others will soon follow.

In addition to these the company have orders for fifty-seven cars from the Selma, Rome, and Dalton Railroad, which include passenger, baggage, and flat-cars. The passenger-cars, some of which are nearly finished, are similar in design to those finished for the Air Line. They also have in process of construction two passenger, one baggage, eight box, and ten flat-cars for the New-Haven and Derby Railroad. Then the South-Side Railroad of Long Island have ordered a large number of cars of different kinds, to be delivered in the spring. The company have all they can possibly do this winter, and are negotiating with some of the best railroad companies in the country for summer trade. Mr. James T. Leighton, the efficient superintendent of this company, is a master mechanic, and during his connection with the same he has introduced many valuable improvements which the company can but appreciate; nothing escapes his notice from the foundation to the completion of the work placed under his supervision.—*Palladium.*

ARITHMETICAL.—Any number of figures you may wish to multiply by 5 will give the same result if divided by 2—a much quicker operation; but you must remember to annex a cipher to the answer when there is no remainder, and when there is a remainder, whatever it may be, annex a 5 to the answer. Multiply 464 by 5, and the answer will be 2320; divide the same by 2, and you have 232, and as there is no remainder, you add a cipher. Now take 359, multiply by 5, the answer is 1795; on dividing this by 2, there is 179 and a remainder; you therefore place a 5 at the end of the line, and the result is again 1795.

The National Car-Builder,

PUBLISHED MONTHLY,

BY

VOSE, DINSMORE & CO.,

1 BARCLAY STREET, NEW-YORK,

AND

15 LA SALLE STREET, CHICAGO.

Terms, 50 cents per Annum.

Editorial Announcements.

CORRESPONDENCE.—*We cordially invite the coöperation of the railroad public in affording us the material for a good mechanical paper. Articles relating to rolling stock and machinery, by those practically acquainted with those subjects, will be gratefully received. All communications must be addressed to Vose, Dinsmore & Co., No.* 1 *Barclay Street.*

The name and address of the writer must accompany all communications designed for publication.

ADVERTISING RATES.—*For one square, or one fifth of a column,* $5 *per month, or* $50 *a year. For half a square,* $3 *per month, or* $25 *a year. Larger advertisements by special contract.*

All communications in regard to advertising should be addressed to L. F. DINSMORE, *Post-Office Box* 4055, *New-York City, who is our agent for advertising, and authorized to make contracts, collections, etc.*

ENGRAVINGS AND ILLUSTRATIONS.

We would invite the attention of Master Car-Builders and others to the advantages to be derived from publishing in THE NATIONAL CAR-BUILDER *engravings designed to illustrate the various features and details of car construction, and especially such improvements as can not otherwise be clearly presented. We will procure cuts to be made in the best manner from drawings or models that may be sent us, and charge only for the cost of engraving, inserting the same in our paper with suitable descriptive details, without charge. The cuts thus made by us, or that may be sent us for use in* THE NATIONAL CAR-BUILDER, *will of course be returned promptly to the owner.*

Happy New-Year.

IN extending as we do to our many readers the customary greetings upon the advent of a new year, we desire to acknowledge the liberal support and encouragement we have thus far received in conducting a paper devoted to the interests of railway rolling-stock. A half-year has elapsed since the issue of our first number; and although this is but a brief period in the life of a monthly periodical, our subscription-list has grown from day to day to an extent which more than fulfills our expectations.

A publication devoted to the special interest of car construction may seem to be restricted to a comparatively narrow field; but such is not the case. There is no branch of mechanical industry more progressive in its character, or presenting, in the variety of its details, a wider scope for the exercise of inventive skill. A great deal has already been done. One improvement has succeeded another in the freight and passenger equipment of our railroads, until a degree of completeness has been attained such as no one anticipated twenty years ago. There is no reason to doubt that a corresponding improvement will not be realized in the future.

Our purpose is to do all we can to aid in the work, by making THE CAR-BUILDER a medium of intelligence and information suited to the wants of this department of railway enterprise; and, in order that such aid may be the more effective, we invite the coöperation of all who sympathize in the object to be attained. Our columns will be open to contributions, in the shape of correspondence containing local news, valuable suggestions, or discussing in an amicable spirit matters upon which there are conflicts of opinion. While we are thus far conscious of many short-comings on our own part, we shall endeavor to make the future numbers of our paper an improvement upon those already issued in the general character and quality of its contents. The low price of subscription will insure for it a correspondingly wide circulation, and thus render it a valuable medium for advertising, to manufacturers, supply-dealers, and others who desire to bring their business to the notice of the great railway public. We solicit a continuance of the favors of our friends in this respect, and the coöperation of all our readers in extending our circulation; thus helping us to make THE CAR-BUILDER acceptable to them and satisfactory to ourselves.

Adjustable Car-Seats

IT would be a great boon to the traveling public, if some plan could be devised by which the ordinary passenger-car seat could be rendered capable of further transformation than that of being simply reversed. What is wanted is a seat that will allow the occupant to change his position so as to relieve the monotony and weariness of an erect posture. This the ordinary car-seat does not permit him to do, except to a very limited extent, unless he is fortunate enough to secure and retain a double seat, and even then the unfilled gap between the seats renders his position untenable for any great length of time.

We learn from the Chicago *Railroad Gazette*, that a remedy for this inconvenience has been found in "Blood's Patent Car-Seats," which are an improvement upon previous devices, and have received the indorsement of experienced railroad men and car-builders. The mode of construction is said to involve but a trifling cost, and consists merely in a change of the irons on which the backs of the seats revolve, enabling the traveler to secure instantaneously a half reclining position, and a support for the head. The back of the seat can be entirely revolved, so as to cover the space between the seats, thus furnishing a comfortable lounge for at least two persons. "These changes," says the *Gazette*, "are all made without trouble by graduating the movement of the shifting irons to the desired position; and when the wished-for arrangement is made, a lock attached to the shifters secures them firmly in their place until another change is desirable. The devices are so simple that they may be worked by the comfort-seeker without instruction, even though he have not a 'mechanical turn of mind.'

"Commending these improvements is not predicting that they will supersede, or even materially encroach on the province of, sleeping-coaches. Added comfort in day-cars will be rather provocative of a desire for the other comforts of sleeping-cars, among which are privacy, toilet facilities, attendance, and purer air than is found in most day-cars.

"But the improved seat will be found useful in very many cases by night as well as by day. Invalids, for instance, can travel in comparative comfort by day, on trains that have no sleeping-cars. Hundreds and thousands of travelers who spend but part of a night on a train do not think it worth their while to engage a berth, or even to undress, yet could get much welcome rest on one of these seats. Thus they will be especially valuable to local travelers. Moreover, the class is not small—is, indeed, very large, though not often sufficiently considered—of travelers who feel unable to pay for the luxurious accommodations of palace sleeping-cars. To say that these should have no provisions for their comfort, is as unreasonable as to say that there should be no second-class hotels. In every town we see provisions made for people who can not pay a dollar for lodging in a first-class hotel; why should we not also provide for this class on trains?"

These seats have been approved and adopted by the St. Louis and Iron Mountain, Hannibal and St. Joseph, and Kansas Pacific roads, and other railroad companies are negotiating for the use of the invention.

Rubber Centre Spiral Car-Springs.

LETTERS PATENT, numbered and described as follows, were reissued to the National Spring Company of New-York, on the 13th day of December, 1870, through their representatives, Messrs. Vose, Dinsmore & Co.

No. 4202.—COMBINED INDIA-RUBBER AND STEEL SPRINGS.—The National Spring Company, New-York, N. Y., assignee of Erastus T. Bussell.—Patent No. 10,280, dated November 29th, 1853; extended seven years. *Claim.*—The combination of a column of rubber, or its equivalent, whether solid or hollow, with a spiral metallic spring, when the said spring is arranged external to and surrounding the rubber, substantially as and for the purposes specified.

CAUTION.

TO CAR-SPRING MANUFACTURERS, CAR-BUILDERS, AND RAILROAD COMPANIES:

Letters Patent were issued to Erastus T. Bussell on the 29th day of November, 1853, and extended seven years on the 12th day of November, 1867, and on the 13th day of December, 1870, were reissued to the National Spring Company through its representatives, Messrs. Vose, Dinsmore & Co., the said letters patent being for an improved combined India-rubber and steel spring, and securing to the said Erastus T. Bussell the right of making, using, and vending to others to be used, such spring, consisting of a column of rubber, or its equivalent, whether solid or hollow, with a spiral metallic spring placed around the exterior surface of the rubber. Now, therefore, notice is hereby given to all whom it may concern, that the National Spring Company are the only parties authorized to make, use, or vend under said patent the above described spring, consisting of a combination of a column of rubber, or its equivalent, whether solid or hollow, with a spiral metallic spring external to and surrounding the rubber; and that the said National Spring Company of New-York will hold responsible to them all persons who may either make, use, or vend a spring as above described, and secured by said patent, and have authorized and empowered their attorneys and counsel to institute all the necessary legal measures to vindicate and protect their rights under such patent, and also for the recovery of damages for the violation thereof.

THE NATIONAL SPRING COMPANY,

By RICHARD VOSE, *President.*

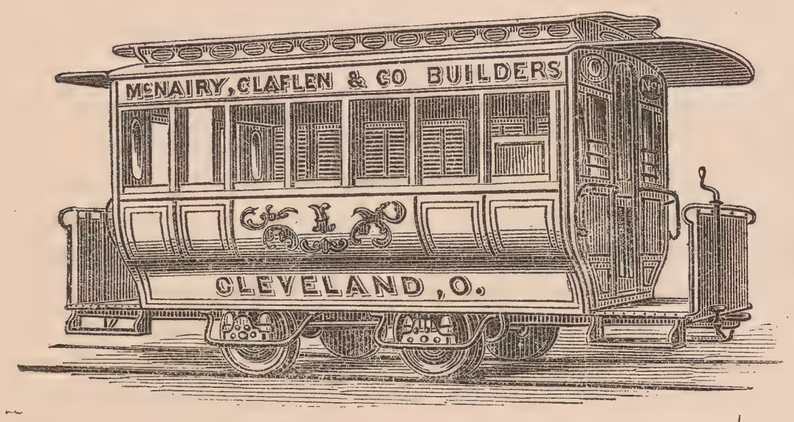
NEW-YORK, Dec. 22, 1870.

We beg to call the attention of railroad managers, car-builders, and others to the subject-matter of the foregoing notice, and to represent to them that the patent referred to covers the well-known *Rubber Centre Spiral Spring*, with its various sizes and modifications; and also all spiral or other metallic springs with a central column or filling of any fibrous or elastic material, whether used separately or in combination with India-rubber. The use of any material other than rubber, in the manner and for the purpose described, is regarded as the equivalent of rubber, and such use is consequently an infringement of the rights secured by the patent. We deem it proper to be thus specific in setting forth the meaning of the words, "or its equivalent," for the purpose of notifying parties engaged in the manufacture of springs in the way and manner above indicated, that in so doing they are assuming a right which does not legally belong to them.

The *Rubber Centre Spiral Spring* combines the two essential materials, steel and rubber, in such a way as to make the strength and elasticity of each available to the utmost extent for the purposes of a bearing-spring. This is not a matter of conjecture or theory, but its utility has been demonstrated by the most thorough practical test, the arrangement, more especially, of the rubber centre spirals in groups inclosed in an iron box casting. As a bearing-spring for freight and passenger-cars, this arrangement is unequaled by any other

device that has thus far been discovered or applied for the purpose.

As set forth in the above-mentioned letters patent, the National Spring Company of New-York have the sole right to manufacture this spring; Messrs. Vose, Dinsmore & Co. being their sole representatives for the sale of all articles manufactured by them. The combined facilities of the two organizations are so complete in all respects for the manufacture of the various kinds of steel and rubber springs, that orders can be executed with the utmost dispatch. The constant and increasing demand for the rubber centre spiral spring, and the large number already supplied to railroads and car-builders, in every part of the country, give assurance of its superior excellence as a bearing-spring, and have won for it an enduring and deserved popularity.



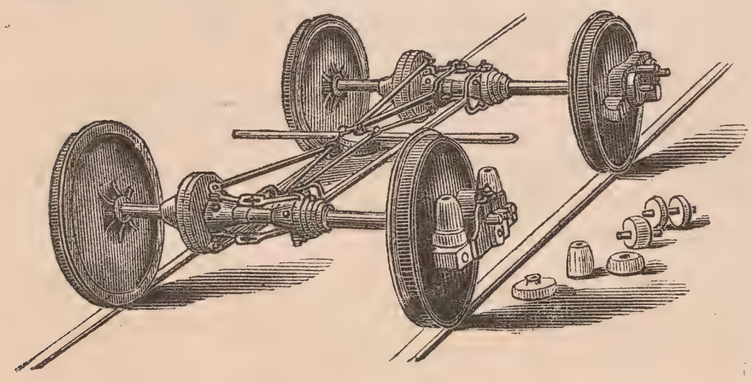
Improved Street Railroad Car.

As a cheap and convenient means of personal locomotion, the street railroad has superseded to a very great extent the use of stage and omnibus, and may be rightly designated as one of the features of modern civilization. Millions of capital are invested in their construction and equipment; and in a single one of our large cities, millions of passengers are transported annually upon them. No vehicle ever devised is so readily accessible, and so essentially democratic in its adaptation to the needs of universal humanity as the street-car. In it the head and the heels of society are brought together, and not unfrequently the contact is so close as to obstruct wholesome ventilation. High and low, rich and poor, judge and pickpocket, saint and sinner, are jumbled together as indiscriminately as under the sod of an old-fashioned graveyard.

This means of transit having become so indispensable, it is important that the system should be brought to the utmost degree of perfection. Any improvement in the details of construction confers a direct benefit upon myriads of our population, including numerous over-worked and poorly paid drivers and conductors. Horses, too, participate in the advantages of diminished friction and dead weight.

Changes for the better in the construction of street cars have been made from time to time, but the latest and most important improvements are embodied in those manufactured by the well-known firm of McNairy, Claflen & Co., of Cleveland, Ohio. The engravings present a view of one of these cars complete, and also of Higley's patent truck and gearing, as it appears when detached from the body of the car. Numerous testimonials from street railway companies in all parts of the country, speak of the practical working of this apparatus in the most unqualified terms of approval. We copy from the circular of the manufacturers above named the following detailed description of the improvements:

The Brake.—The device, in the form of a wheel, on the axle, under the central part of the car, is in two parts; one part, next to the nearest car-wheel, is a shell or dish-wheel, and is made fast to the axle; the other part is a wheel with a conical face, closely fitted into the shell or dish-wheel. The two cone-faced wheels (one on each axle) are loose on the axles, and are connected by bars, as shown in the engraving. On each axle, toward the opposite car-wheels, are shoulders; and between each shoulder and the cone-faced wheel are two knuckle-joints, one above and one below the axle, which are operated by rods connecting them with the brake-lever. When the knuckle-joints are straightened, they form a brace between the shoulder and the cone-faced wheel, crowding the latter into its shell or dish-wheel; and the cone and dish-wheel thus brought in contact constitute the friction surface of the brake. The parts are strong and simple, and not liable to get out of order; and the large friction surface renders the brake very effective.



The Anti-Friction Journal-Bearing—This bearing is formed by three inter-lapping rollers, made of chilled iron or steel, and resting on the top of the journal. The rollers are shown on the ground in the engraving. These rollers have their centre bearings in the cast-iron journal casing or housing on which the car-body rests. The rollers, having a diameter many times that of the journal, revolve, in a corresponding degree, more slowly than the journals; and, as the journal and rollers, revolve in opposite directions, the friction is reduced to its minimum. An examination of this bearing after it had been subjected to hard service for twelve months disclosed no perceptible wear on the surface of the rollers or journal, nor on the roller centre-bearings. The superiority of this bearing in the amount of power required to start a car from rest is very obvious in practice.

The Swing Motion—This is a simple and important device. The car-body, it will be seen, rests on eight rubber springs—the springs resting on projecting shoulders of the journal-casing. Passing vertically through each spring and the shoulder of the casing is a bolt, extending from the car-body to the stirrup-brace below. The hole in the casing shoulder has twice the diameter of the bolt; and by this simple means ample lateral play is given to secure an easy and comfortable swing motion to the car-body. The value of this improvement, in reducing the wear and tear of cars and track, by preventing sharp lateral jolting, and in promoting the comfort of passengers, can scarcely be over-estimated.

The Draw-Head.—This consists of a series of annular rubber springs on the follower, so arranged with reference to the form of the draw head, in combination with the easy-running anti-friction journal-bearing above described, as to wholly avoid the violent jerking so disagreeable usually in starting.

As the products of the works of Petin, Gaudet & Co., the celebrated French steel manufacturers, enter so largely into railway consumption in this country, in the form of tires, rails, tools, and implements of various kinds, we doubt not that some account of the extent of their works and mining resources will be of interest to our readers. A description of the same will be found on our first and second pages.

It is stated that an average Egyptian can see nothing distinctly at a distance of more than 500 yards, and has no acuteness in detecting an object within as many feet. A recent traveler says that when the railway was constructed, the utmost difficulty was found in procuring men capable of seeing or recognizing the difference between signals only a hundred yards off. Many candidates came, but few passed the test. One man was nearly passed, but the engineer was not quite satisfied that the fellow had not been "making good shots" at the colors. So he held up his hat at 150 yards, and the hapless signalman pronounced it to be "the red flag."

Iron versus Wooden Railway Cars.

Some day, we hope not many years hence, passenger-cars of iron will be rule rather than exception, and managers will find that this class of rolling stock combines more elements of safety and eventual economy than any thing that is now in use. The extra weight of iron has been the principal reason why our railway managers have looked with so little favor upon the different devices for using that metal for cars; but this reason is growing of less importance year by year as the weight of wooden cars is increased. At present, many of the eight-wheel passenger-cars weigh eighteen or twenty tons each, and the new styles of cars demanded by modern luxurious taste, such as sleeping, palace, and compartment-cars, weigh fully one half as much more, and it is within a few days we have read a description of one of these just finished for a Western road that weighed thirty-two tons. Most certainly it looks as though railway managers are getting to pay much less regard to the question of weight of rolling stock than they used to do, and will now look with much more favor upon the efforts of inventors to produce a passenger-car that combines great comparative safety to passengers and stability in its best sense. With the improved character of the permanent way and superstructure, and the improved devices for relieving the movements of rolling stock from the effects of jars and concussions incident to rapid locomotion, a greater weight upon each wheel is rendered practicable, that is, without perceptibly increasing the cost of hauling, or shortening the life of the rolling stock or the rail. Modern practice and experience show this to be the fact, and if managers continue to err in this direction, let us hope that they will take the best means for utilizing the extra weight, so as to give the passenger a reasonable assurance of safety from the dire effects of collisions where each broken piece of wood becomes an instrument of suffering and death, and, in cases of fire, where the wood, oil, paint, and varnish became a funeral pile for the unwary. We believe in iron passenger-cars because they can be made to last twice or thrice as long as the wooden cars do. While we have assumed that iron cars will weigh more than wooden ones, we by no means grant the fact. Because the first one or two iron cars, rough and uncouth in design, contained an undue amount of material, and therefore of weight, it by no means follows that improvement can not be made upon those designs, and we believe that if the combined railway managers should offer a liberal sum for the best design for an iron passenger-car, competition among inventors would soon produce a device combining the best elements of strength, safety, and economy. We know no reason why improvement in this direction is not just as possible as in any other branch of mechanical engineering; and when railway managers get over the notion that an iron railway car must of necessity be exceptionally heavy because it is made of that metal, and are willing to look with favorable eyes upon the effort to make a light and strong iron car, we shall find the battle in favor of greater safety and eventual economy more than half gained. Rusty prejudice is the greatest foe of all improvements in railway devices, and has been ever since George Stephenson successfully combatted it by the success of the locomotive. Meanwhile, let not railway managers forget to use and adapt the best safety devices for wooden cars. Let them see that these cars are strongly framed and guarded by all well proved improvements calculated to resist the effects of the hard service to which they are exposed. The next thing to having a better article is to make the best use of that which we have, and wooden passenger-cars can be made comparatively safe, if managers are willing to pay a fair price for the skill and labor necessary to make them so.—*Railway Times.*

Cure for the ear-ache: Get a pretty girl to whisper in it night and morning.

Communications.

RICHMOND, VA., Dec. 15, 1870.

EDITOR OF THE NATIONAL CAR-BUILDER:

DEAR SIR: I have had the pleasure of reading several numbers of your valuable paper, and have been much interested in the variety of matter it contains concerning railroads, and especially the construction of rolling stock and whatever is incidental thereto. In regard to this important branch of railroad management, I have nothing of special interest to suggest in the way of a contribution to your columns. My present purpose is merely to offer a word of encouragement for the enterprise in which you are engaged, and give you a few items, gleaned from this locality, which may have some interest for the mass of your readers. The railroad business which centres here, including the construction and repair departments, exhibits a healthy activity, and the freight and passenger traffic on the various lines is all that we can reasonably expect. The many improvements that have been introduced at the West and North are being adopted here as fast as our limited means will permit, and we feel confident that the day is not distant when our roads, in point of equipment and efficient management, will compare favorably with any in the country. Our city a few years ago was the centre of attraction in a warlike point of view; but the traces of those troublesome times are fast being obliterated by a revived and productive industry in every department of life. The sum of individual comfort and prosperity is increased, capital is gradually accumulating, and the many resources of our soil and climate are being developed and brought into requisition.

The car department of the Richmond and Danville road has just completed three superior mail and baggage-cars, and the shops are also busy upon freight work. This road is under the superintendence of Colonel Dodamead. The Pullman Company have placed upon this route three of their improved sleeping-cars, and run them through to Charlotte, N. C. They are provided with Tisdale's adjustable axle, which gives entire satisfaction. A number of freight-cars on this route also have this axle. The settlements on the line of this road are increasing, also the freight and passenger traffic, giving assurance of a largely increased business at no very remote period in the future.

The Chesapeake and Ohio road has just completed a very fine passenger-coach which will compare favorably in all respects with any in the country. It will be placed on the road early in the spring. The rolling stock generally of this road is of excellent quality and in good condition. The car department is under the direction of Mr. John M. King, whose skill and ability are manifest in the character of his work. The stockholders had a meeting last month at the Exchange Hotel, in this city, and the results showed that the road is paying its way. The chief engineer, Mr. Whitcomb, is rapidly pushing it through to its terminus, when it will be one of the most important lines to the West.

The Richmond, Fredericksburg, and Potomac Railroad, under the superintendence of Major Myers, has an excellent passenger equipment. The repair-shops are in charge of Mr. Trainham, who keeps fully up with the times in the adoption and appreciation of all modern improvements calculated to advance the interests of the road. He has, at present, no new work in hand in the way of car construction. The Richmond and Petersburg road keeps on in its usual way, is always ready with its connections for the through trains, and also keeps up the fare between the two cities, which many think might be lowered a peg without detriment to the road or the public. Mr. Thomas K. Wynne is the General Superintendent.

The Tredegar Iron-Works have been building thirty-eight freight-cars a month for some time past, and are crowded with work. They are, however, about closing their contracts for cars, and will not work full time in the car department during the short winter days, with a view to avoid the danger of fire from having lights in the shops.

The railroad men here are not unmindful of the fact that our city is to be honored with the next annual convention of the M. C. B.'s. The event is looked forward to with pleasure as one that will afford us an opportunity to make new acquaintances and confirm old ones, and confer mutual benefits by consultation and discussion; and in order that the "inner man" may be in a condition to coöperate effectively with the mental apparatus which every M. C. B. is presumed to carry about with him on such occasions, we shall see to it that the hospitality dispensed is of such a character as to reflect no disgrace upon the ancient renown of the OLD DOMINION.

Mobile and Ohio Car-Trucks.

EDITOR OF THE NATIONAL CAR-BUILDER:

DEAR SIR: The October number of your paper contained a notice of the Mobile and Ohio car-shops, copied from the Mobile *Daily Register*, in which allusion was made to certain improvements in car-trucks introduced by Major L. J. Fleming, Chief Engineer of the Mobile and Ohio Railroad. This article from the *Register* elicited a communication from your correspondent "X.," which was published in the November number of THE CAR-BUILDER, denying that it was a new device to place the brakes between the wheels, as claimed by the writer of the article; also making certain inquiries regarding the use of equalizing-bars in six-wheeled trucks so as to bring the body of the car a foot lower than usual; and also requesting a more particular description of the improvment in the coupling and draw-bar of freight-cars.

For the information of your correspondent, I will endeavor to describe the passenger and freight-car trucks, and the coupling and bunting apparatus in use on the above-named road. The absence of drawings, and the comparatively brief limits to which I must restrict myself, will, I fear, render my description more or less imperfect. It is proper to state that the article copied from the *Register* was evidently not written by a mechanic, and consequently it is not strange that a few inaccuracies should have escaped the attention of the writer.

First, as regards the *four-wheeled passenger-car truck*. The distance between centres of axles where double springs are used is sixty-five inches, and where triplets are used, sixty-nine inches. On each side of the truck are two equalizers, four inches by one, forged to fit and clasp the journal-box, one of which is on the inside and the other on the outside of the pedestal, and both are kept in place by flanges cast on the journal-box. To guard against accidents from the failure of hangers and pins, safety-straps pass under the sand-board, up inside of and over the transoms, and are turned up to carry the casting for the brake-hangers. Two volute or rubber springs rest on castings on the equalizers, and support the truck side-frame, and are placed inside of and close to the pedestals. The brakes do not slide, but are hung between the wheels, and the brake-beams are made long enough to fall on the equalizers should the hangers or safety-chains give way. As there is but little strain on the truck side-frame outside of the rubber or volute springs, it is cut away over the journal-box to one half its depth, and the pedestal cast to fit it, so that the bottom of the truck-frame side will be two or three inches below the top of the journal-box, thus bringing the upper floor of the car down nearly or quite, if desired, to the flange of the wheel. The springs used for the swing motion are compound elliptic, from thirty-eight to forty inches in length. They are either couplets or triplets, and each spring is composed of two outer and two inner ones, the former having from three to five, and the latter from two to four, three by five-eighth leaves. The inner springs are concentric with the outer ones, but inverted and kept in place by flanges on the ends which permit them to play freely upon and act uniformly with the outer ones.

The *six-wheeled passenger-car trucks* are ten feet six inches between centres of outside axles, and are constructed upon the same general principles as the four-wheeled ones, except that two volute or rubber springs are placed on the equalizers between the middle and the outside pairs of wheels on each side, and connected by a knuckle joint so as to distribute the weight properly and allow space for the brakes to play between the wheels. The outside wheels are thirty-three, and the middle ones twenty-eight inches in diameter. This allows the side bearings to be placed over the middle wheels, and the car-body is at the same time brought much lower than usual. The passenger-car platforms are level with the upper floor of the cars.

The *freight-car trucks* are of the ordinary form of iron truss, with swing motion, and volute or rubber springs on the sand-board, but without springs over the journals. The wheels or journal centres are five feet three inches apart. Safety-straps similar to those used on four-wheeled passenger-car trucks are used to guard against accidents from the failure of swing-beam hangers and pins, and to carry the casting for the brake-hangers. To prevent the brakes from falling on the track, should the hangers or pins fail, the pins which pass through the lower ends of the swing-motion hangers are made sufficiently long to catch the brake-beams. The freight-car coupling and bunting apparatus is made of two beams of wood, four inches by five, extending the whole length of the car, with a cast-iron bunter-head strapped on and bolted through these beams. The beams are placed three and a half inches apart, and a curved recess is cut out to fit the springs, which are six inches long and five in diameter. The bunting is done on a projection cast on the top centre-plate, and the springs, after being compressed with a pressure of about two tons, are fastened in place by filling in the space between the two long wooden beams with short pieces of scantling and securely bolting them together. Four bunter springs are used to each car—one on each side of each top centre-plate—and the shock in bunting is divided between the truck and car-body, and at the same time transmitted to the rear cars. This form of bunter entirely dispenses with the heavy and expensive wrought-iron forging ordinarily used, and obviates the trouble of "pulling out bunters" and losing bunter springs on the road. All bolt-heads and nuts that come in contact with iron are kept tight by starting the metal by the side of the bolt-head and nut, after being properly screwed up. If necessary afterward to take off the nut, the metal can be easily flattened. This in a great measure prevents nuts and bolts from working loose where they come in contact with iron.

It is difficult to describe details of intricate mechanical construction without the aid of drawings, but I trust the above brief description of the peculiarities of the trucks referred to will give your correspondent a tolerably correct idea of them. In conclusion, I desire to point out more particularly *what is new* in the construction of these trucks, or what seems to me to be new after more than thirty years' experience and observation in the matter of railway rolling stock. I claim as new features:

First, the form and use of two equalizers placed on the inside and outside of the pedestals of passenger-car trucks, and the manner of keeping them in place. Two equalizers have been used on engine-trucks for twenty-seven years.

Second, the long brake-beam and its arrangements to fall on the equalizers, should the brake-hangers or safety-chains fail. This arrangement is entirely different from the *sliding*-brake on the New-York Central Railroad.

Third, the compound elliptic spring, by which that form of spring is strengthened at its weakest point without impairing its elasticity.

Fourth, the form of the safety-strap to carry the brake-hanger casting, and to guard against accidents from the failure of spring-motion hangers and pins. Safety-straps to accomplish this object have been in use many years.

Fifth, the long pin through the lower ends of swing-motion hangers of freight-trucks to catch the brake-beams. Also the projection on the top centre-plate, and the use and plan of arranging the four bunter springs on freight-cars. The wooden beams with the cast-iron bunter-head strapped and bolted on have been in use twenty-three years.

Sixth, the use of smaller wheels in the middle of a six-wheeled truck, and the knuckle joint connection between the two side springs, to distribute the weight properly between the middle and outer wheels, and to allow space for the brakes between the wheels.

MOBILE.

Master Car-Painters' Convention.

THE master car-painters of the United States met at Preble Hall, No. 176 Tremont Street, Boston, November 9th, 1870, for the purpose of forming an association to be known as the Master Car-Painters' Association of the United States, the following gentlemen being present:

Joseph Hill, Jr., P. & K. R. R., Augusta, Me.
Warren Bailey, B. & M. R. R., Lawrence, Mass.
H. L. Scott, B. & L. & N. R. R., E. Cambridge, Mass.
John B. Cox, Eastern R. R., Salem, Mass.
Samuel Lunt, Fitchburg R. R., Somerville, Mass.
J. Platt, Old Col. & Newport R. R., S. Boston, Mass.
George Prescott, C. M. & L. R. R., Concord, N. H.
R. T. Beazley, Me. Central R. R., Waterville, Me.
S. E. Kirkpatrick, Vt. Central R. R., St. Albans, Vt.
A. H. Dean, P. & W. R. R., Providence, R. I.
Chas. W. Hazeltine, Northern R. R., Concord, N. H.
W. H. Jewett, Vt. & Mass. R. R., Fitchburg, Mass.
Chas. W. Hinkley, Cape Cod R. R., Hyannis, Mass.
W. B. Getchell, Eastern R. R., East-Boston, Mass.
C. E. Paige, Allen Judd, Taunton Car Co., Taunton, Mass.
P. Rudrauff, Lehigh & Susq'a R. R., Wilkesbarre, Pa.
M. W. Stines, B. & A. R. R., Springfield, Mass.

Mr. Joseph Hill, Jr., called the meeting to order, and proceeded to explain the object for which it was called; also the good resulting from such an organization as the one now to be formed by the master car-painters.

The convention proceeded to organize an association by electing the following gentlemen as officers for the present year: President, Joseph Hill, Jr.; Vice-President, S. E. Kirkpatrick; Secretary and Treasurer, M. W. Stines.

The Committee on Resolutions offered the following:

Resolved, That we, the master car-painters of the United States, have assembled here for the purpose of promoting the interests of the craft, by discussing the different methods now used in painting rolling stock on railroads—knowing that, by a general discussion of the subject, we may all profit by the experience of others, and become more proficient in our craft and of increased service to the corporations employing us.

Moved, That a committee of three be appointed to ascertain the most practical method of detecting the adulteration in paints, and other materials used in painting railroad cars. The following gentlemen were appointed such committee, to report at the next meeting of the association: A. L. Scott, Samuel Lunt, James Platt.

Moved, That a copy of the transactions of this association be furnished to master car-painters throughout the United States, with the request that they call the attention of the superintendent, master mechanic, and car-master to it.

Moved, That a committee of five be appointed to select a time and place for holding our next meeting. Warren Bailey, S. E. Kirkpatrick, R. T. Beazley, Peter Rudrauff, and John B. Cox were appointed such committee.

The remainder of the day was occupied in discussing the following questions: The best way to produce a good finish on passenger-cars, with the least amount of labor and material; the best way to set glass in locomotive head-lights; the cause of, and how to prevent the flatting of varnish.

The committee reported it expedient to hold the next annual meeting of the Master Car-Painters' Association at the St. Nicholas Hotel, in New-York, September 6th, 1871. The association cordially invite all master-painters to be present.

After some concluding remarks by the president, the convention adjourned at six o'clock P. M.

M. W. STINES,
Secretary M. C. P. A., Springfield, Mass.

Master car-painters throughout the United States are requested to send their address to the secretary.

The Missouri Car and Foundry Company.

WE copy from the St. Louis *Journal of Commerce* the following notice of the works of this company: "These works cover about 4 acres, employ upward of 400 hands, and are turning out six cars—four box and two flat cars per day. This company commenced operations on the first of May last, since which time they have built about 800 cars, and never have solicited orders outside of St. Louis—having thus far an active demand for cars up to the present capacity of their works. Their cars are in use on the South-Pacific, Iron Mountain, North-Missouri, St. Louis and South-eastern, St. Louis and St. Joseph, Kansas Pacific, Denver Pacific, Missouri, Kansas and Texas, Mississippi and Ouachita roads, etc., on all of which they have given entire satisfaction.

Ever since railroads were introduced, manufacturers and experts have been constantly experimenting upon the size, shape, and combination of irons best adapted for car-wheels. This company are making car-wheels a specialty, are manufacturing 60 per day, and are determined to make them as good as the best; to this end they have a hydraulic press for testing the tensile strength of the iron used, some of which has given as high as 28,250 lbs. per square inch. The company make their own patterns, and manufacture every thing, (except axles and springs,) employing the most improved machinery for every department. Those familiar with the ordinary routine of carpenter or blacksmith work, and who have never seen the same done by machinery, would be surprised to witness the vast saving of manual labor resulting from the use of machinery. Carpenters who push the jack-plane would be interested in seeing the Woodworth planing machine dress both sides, tongue and groove the edges and double groove the upper edge for car-roofs—all by passing rapidly through the machine once, and thus finishing 2500 feet per hour; or a machine which will bore a hole of any required size one foot through the most solid oak in less than one second. Here is a Lewis, Oliver & Phillips steam bolt-machine—the only one west of the Mississippi, and the best machine for the purpose extant—that turns out 3000 bolts per day, thus accomplishing much more work with one fire and two men than could be done by eight men using four fires in the usual manner.

This company are using the superior axles made at Helmbacher's steam forge in this city, of which we will speak hereafter. Vose, Dinsmore & Co.'s car springs are coming into very general use, are universally popular among railroad men, and are used by this company exclusively. Besides the extensive establishment alluded to, the company have a foundry in the lower part of the city, turning out ten tons of railroad castings and fifteen tons of wheels per day.

If there is any one branch of industry more than another that the citizens of all classes, of this city and country, should foster and encourage, it is manufactures. The beneficial influences of this and of similar establishments are not confined to the city alone, but extend to the mines, and forests, and fields many miles away. The pay-roll of this company amounts to about $24,000 per month. This money is expended in the city, and the workmen patronize home dealers in groceries, dry goods, clothing, etc., and help to support home newspapers, schools, churches, etc., etc. Six months ago, all this work was done elsewhere, and many of these employees are new citizens, and have come to stay—as this company is a *fixture*. Four hundred tons of iron per month and two hundred car-loads of lumber per month are utilized by this company, which six months ago had here no market. Counting the families, we may safely estimate 2000 souls who derive a support from these works, and whose weekly wages or profits go to furnish a home market for our home products and for our city dealers.

Miscellaneous Items.

JACKETS FOR STEAM-BOILERS.—The practice of insulating steam-boilers with a loose jacket of wood or tin, and filling in the cavity between the two surfaces with plaster of Paris, is now coming into use extensively and with marked results. Independent of economy of fuel, the radiation of the heat is greatly reduced, and consequently applied more directly to the formation of steam; while there is much less inconvenience and annoyance to the fireman from the heat. When the gypsum has hardened, the exterior casing may be removed, if it is considered expedient. Quite recently cork has been used for a somewhat similar purpose, especially for coating tubes for conducting hot air or water, and for locomotives.

THE Hocking Valley Car Company has just been organized in Columbus. The company is to carry on the business of manufacturing cars for the transportation of coal, iron, and other freight on railroads, and all the business connected with the manufacture of such cars, etc. The capital stock is $100,000, in shares of $500. The corporators are William McCrory, John G. Deshler, H. T. Chittenden, E. A. Fitch, and Wal stein Failing.

THE Union Pacific Railroad Company furnished rations to contractors during its construction, and of course large purchases of provisions were made. It appears that the stock was not wholly consumed and not entirely well proportioned. A little more than a year ago, we are informed, the company had still on hand *twenty tons* of *black pepper—enough*, one would think, to season the whole territory between Omaha and Salt Lake.

A NEWSPAPER item says that the Worcester and Nashua Railroad has an appliance attached to its passenger locomotives in the shape of a large pipe connecting the smoke-stack with the fire-box, by which means the great nuisance of flying cinders is obviated, they being all reburned.

THE Acting Commissioner of Patents on the 2d inst. decided to extend the Woodruff sleeping-car patent for another term of seven years. The patentees argued that it had cost so much to introduce the patent for the first seven years that they only realized $20,000 profit therefrom.

A NUMBER of large and magnificent palace and drawing-room coaches are now being built in the shops of the New-Jersey road at Jersey City for the Washington express trains, which, from present appearances, will soon be stocked with the grandest and most luxurious passenger-carriages of any line in the country.

THE Pennsylvania Railroad has not leased the Camden and Amboy line, all rumors to the contrary notwithstanding. Overtures have been made to the direction, but nothing has been agreed upon.

A CHICAGO bootblack has made the trip to San Francisco in forty-five days, riding on the cars till put off, which was at every station.

THE convention of railway officers at Erie, Pennsylvania, sits with closed doors, but it is surmised that the project for "pooling" the earnings is received with indifference by the representatives of the New-York Central and the Western railroads. The delegates were entertained by the city authorities yesterday.

ON last Saturday a train of nineteen cars, laden with tea direct from San Francisco, passed through Harrisburg, Pennsylvania, on the way to New-York. The time made from San Francisco was good, although the hot axle boxes prevented the train from running on the express freight schedule. The cargo, it is stated, is worth near $300,000.

ON some roads it is customary to have a lock on the stove to prevent the passengers from meddling with the fire. A conductor being asked why they locked the stove, replied that it was "to prevent the fire from going out."

THE Boston, Hartford, and Erie Railroad case came up in Boston recently, and was adjourned over. Certain creditors have put in a petition for a decree in bankruptcy, and the question of jurisdiction is under advisement.

THE Richmond and Petersburg Railroad Company have abolished the office of superintendent, and elected the late Superintendent, Thomas H. Wynne, President.

A CONDUCTOR on the Toledo, Wabash, and Western road, while the train was running at its full speed, shot and killed a quail on the wing, at a distance of about fifty feet, with a small Derringer pistol.

DEATH on the rail is being compensated by births. A child was born the other day on one of our street-cars; another more recently on a Hudson River train; and still another on the Kansas-Pacific road, the last being a child of Col. C. B. Lamborn, secretary of the road, and was born during the excursion to Denver. The party immediately presented the child with an elegant gold watch and chain, which we suppose is equivalent to being born with a gold spoon in one's mouth.

A STEAM-ENGINE weighing four ounces, and which can be covered with a tumbler, but which is capable of performing one thousand revolutions per minute, is on exhibition at Troy.

Facetiæ.

A WESTERN preacher, while exhorting his hearers to repentance with great earnestness, spoke in passionate terms of the purity of his own motives—he had no concealments—he wished there was a pane of glass in his bosom that every one could see his heart. At this point, a man rose, and with marked solemnity asked the reverend gentleman "if he did not think a *pane* in his stomach would do just as well?"

SCENE AT CONGRESS HALL, SARATOGA.—"My dear Bella, who is that frowsy-looking woman in the corner, with the horrid red nose?" "Why, Clara, dear, that is Mrs. De Codfish, of Mackerel Square, New-York." "Dear me! is she any body in particular?" "Why, love, most certainly; she is a twenty-three-trunk lady." "Is it possible? *Do* introduce me—what a splendid looking creature she is!"

A WOMAN was testifying in behalf of her son, and swore "that he had worked on a farm ever since he was born."

The lawyer who cross-examined her said, "You assert that your son has worked on a farm ever since he was born?"

"I do."

"What did he do the first year?"

"He *milked*."

The lawyer evaporated.

To remove stains from character—get rich.

A DISSIPATED young man, who ran away from home and spent his substance in riotous living, resolved at last to return to the paternal roof. His father was kind enough to forgive the young rascal for his wickedness, and rushing into the house, overcome with joy that the boy had returned, cried out to his wife, "Let us kill the prodigal; the calf has returned!"

"As I was going over the bridge the other day," said a native of Erin, "I met Pat Hewins. 'Hewins,' says I, 'how are you?' 'Pretty well, thank you, Donnelly,' says he. 'Donnelly?' says I, 'that's not my name.' 'Faith, then, no more is mine Hewins.' So with that we looked at aich other agin, an' sure enough, it was nayther of us."

AN old lady in Pennsylvania had a great aversion to rye, and never could eat it in any form. "Till of late," said she, "they have got to making it into whisky, and I find that I can now and then worry down a little."

A LITTLE boy asked his mother what blood relations meant. She explained that it meant near relations, etc. After thinking a moment, he said, "Then, mother, you must be the bloodiest relation I've got."

A WAG, speaking of a blind wood-sawyer, says that 'while no one ever saw him see, thousands have seen him saw."

A MAN named John Hole was so lazy that, in writing his name, he simply used the letter J, and then punched a hole through the paper.

WE lately heard a desperate threat made by a man who was short of funds. He said he would have money—if he had to work for it.

"CORN-BREAD, sir?" said an Irish waiter, freshly imported, to a guest at a hotel. "Isn't it corn bafe ye mane?"

"WHAT are you writing such a big hand for, Pat?" "Why, you see my grandmother is dafe, and I am writing a loud letter to her."

"YOUNG man, do you believe in a future state?" "You bet, and what's more, I'm goin' to enter one as soon as Betsey gits her things ready."

A RECIPE for making chicken-soup in restaurants: Hang up the carcass of an old hen or rooster in the sun, so that its shadow will fall in a pot of boiling water. This will do in sunshiny weather, but on cloudy days the soup is apt to be weak.

THE Charleston *Courier* says that a young widow of that place has just celebrated her wooden wedding by marrying a blockhead.

A GOOD sort of man was recently asked to subscribe for a chandelier for the church. "Now," said he, "what's the use of a chandelier? After you get it you can't get any one to play on it."

Locomotve Builders.

Baldwin Locomotive Works	Philadelphia, Pa.
Brooks Locomotive Works	Dunkirk, N. Y.
Danforth & Cooke	Paterson, N. J.
Dickson Manufacturing Co	Wilkes-Barre, Pa.
Grant Locomotive Works	Paterson, N. J.
Hinckley & Williams	Boston, Mass.
Manchester Locomotive Works	Manchester, N. H.
Mason, William	Taunton, Mass.
McKay Iron and Locomotive Works	Jersey City, N. J.
Portland Company	Portland, Me.
Pittsburg Locomotive Works	Pittsburg, Pa.
Rogers Locomotive Works	Paterson, N. J.
Rhode Island Locomotive Works	Providence, R. I.
Schenectady Locomotive Works	Schenectady, N. Y.
Smith & Porter	Pittsburg, Pa
Taunton Locomotive Works	Taunton, Mass.

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A competent person is wanted to take charge of the erection and management of Car Works about to be located in a Western City.

It is requisite that such an one should possess good business qualifications, as well as a most THOROUGH experience in the building of all classes of cars. An interest in the business would not be objectionable.

All communications should contain full information on the above points, and will be treated with the strictest confidence.

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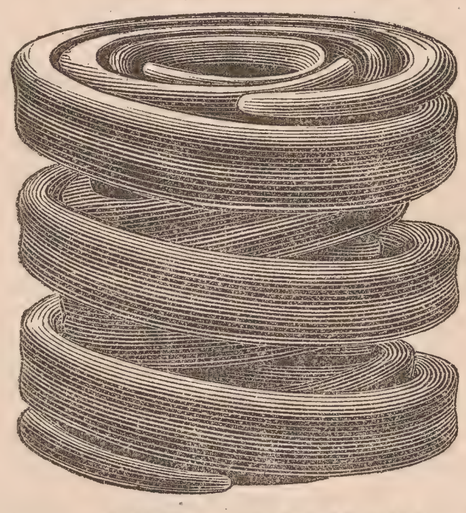

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Atlantic & Great Western		N. H. Marsh	Kent, Ohio.
Atlantic & Gulf	C. Collins	J. Sullivan	Savannah, Ga.
Alexandria & Fredericksburg			Alexandria, Va.
Alabama & Chattanooga	H. M. Smith	H. M. Smith	Chattanooga, Tenn.
Atlantic & North-Carolina	E. J. Clayton	E. J. Clayton	New-Berne, N. C.
Atlanta & West-Point	Wm. Rushton		Atlanta, Ga.
Atlanta & West-Point	R. D. Cole		Newnan, Ga.
Atlantic & Pacific	J. N. C. Wellinger		Pacific, Mo.
Allegheny Valley	G. W. Glass	R. Gunning	Pittsburg, Pa.
Androscoggin	Ira K. Russell	C. S. Greenwood	Farmington, Maine.
Adirondack			Saratoga, N. Y.
Alexandria, Loudon & Hampshire	Nathaniel Hayes	Nathaniel Hayes	Alexandria, Va.
B			
Bay de Noquet & Marquette	John J. Murphy	H. D. Lyons	Marquette, Mich.
Bangor, Old Town & Milford	J. B. Peckham	John H. Brown	Bangor, Maine.
Bennington & Rutland	John Haining		Rutland, Vt.
Baltimore & Ohio	John C. Davis	John C. Davis	Baltimore, Md.
Bellefonte & Snow Shoe	H. D. Landis	H. D. Landis	Bellefonte, Pa.
Belvidere Delaware	R. McDowell	John Silvers	Lambertville, N. J.
Boston & Albany	Wilson Eddy	F. D. Adams	Springfield, Mass.
Boston & Albany	A. B. Underhill	W.E.Chamberlain	Boston, Mass.
Boston & Providence		John Lightner	Roxbury, Mass.
Boston, Clinton & Fitchburg	John Webster	Samuel Stevens	Fitchburg, Mass.
Boston, Concord & Montreal	R. Adams	M. R. Elkins	Lake Village, N. H.
Boston & Maine	N. G. Paul		Boston, Mass.
Boston & Maine		D. C. Richardson	Lawrence, Mass.
Boston & Lowell & W. L.	L. R. Winslow	S. A. Davis	Boston, Mass.
Blossburg & Corning	O. C. Patchell	O. C. Patchell	Corning, N. Y.
Brockville & Ottawa	Joseph Cockfield	Joseph Cockfield	Brockville, Can.
Blue Ridge			Anderson, S. C.
Burlington & Missouri River	G. Chalender	G. Chalender	Burlington, Iowa.
Burlington, Cedar Rapids & Minn			Burlington, Iowa.
Buffalo & Erie (see Lake Shore)	William Hart	J. N. Mileham	Buffalo, N. Y.
Buffalo & Washington			Buffalo, N. Y.
Boston, Hartford & Erie	D. Thomas	Elias Pratt	Boston, Mass.
Buffalo, Corry & Pittsburg	Thomas Connell	Thomas Connell	Corry, Pa.
Buff. Bayou, Brazos, Colorado	E. Perry	M. Borst	Harrisburg, Tex.
C			
California & Pacific	O. R. Ford	D. Rutherford	Vallejo, Cal.
Camden & Amboy	F. B. Stevens		Hoboken.
	T. T. Kerr	E. Lockwood	Bordentown, N. J.
	Thomas Single		South-Amboy.
Camden & Atlantic	E. Collings	S. Wills	Camden, N. J.
Catawissa	A. J. Prescott	G. P. Fenstermacher	Catawissa, Pa.
Cape Cod	E. A. Walker	William Cannon	Hyannis, Mass.
Calais & Baring	Chas. W. Butler	Chas. W. Butler	Milltown, Me.
Cascade	E. Copley	James Smith	Cascades, W. T.
Catasauqua & Fogelsville	Thomas Evans	Chas. S. Holbach	Catasauqua, Pa.
Carrolton & Oneida	M. T. Wiggins		Carrolton, Ohio.
Charleston & Savannah	H. T. Calder		Charleston, S. C.
Chesapeake & Ohio	W. G. Freeman	J. N. King	Richmond, Va.
Cheraw & Darlington			Cheraw, S. C.
Champlain Trans. Co	H. T. Calder		Burlington, Vt.
Cheshire	F. A. Perry	F. A. Perry	Keene, N. H.
Charlotte & South-Carolina	T. D. Kline	W. T. Brown	Columbia, S. C.
Chicago & North-western		Thomas Hull	Chicago, Ill.
Wiscon. Mad. & Mill. Divis	T. B. Tilton	Henry Hull	Fond du Lac, Wis.
Galena Division	R. W. Bushnell	Hugh Gray	Chicago, Ill.
Chicago & N. W. Iowa Division	C. C. Elliott	William Campbell	Clinton, Iowa.
Chicago & N. W. Peninsula Division	S. L. Pierce		Escanaba.
Chicago & Alton	John A. Jackman	R. Reniff	Bloomington, Ill.
Chicago, Burlington & Quincy	C. F. Jauriet	W. W. Wilcox	Aurora, Ill.
Chicago, Cincinnati & Louisville	C. F. Kidder	D. B. Howe	La Porte, Ind.
Chicago, Rock Island & Pacific	T. B. Twombly	J. I. Fogg	Chicago, Ill.
Cleveland, Col., Cin., & Indianapolis	L. S. Young	William Cleve	Cleveland, Ohio.
Cleveland and Pittsburg	N. E. Chapman	N. E. Chapman	Cleveland, Ohio.
Cleveland, Zanesville & Cincinnati	J. W. Holloway	J. W. Holloway	Akron, Ohio.
Cincinnati, Hamilton & Dayton	William Cullen	W. H. Allison	Cincinnati, Ohio.
Cincinnati & Zanesville	Peter Green	D. J. Jewell	Lancaster, Ohio.
Cincinnati & Indianapolis Junction	O. H. P. Little	W. W. Degnacey	Cambridge, Ind.
Cincinnati, Sandusky & Cleveland	Wm. Swanston	William Earick	Sandusky, Ohio.
Concord	E. Studley	M. W. Dickerman	Concord, N. H.
Concord & Claremont	J. N. Lander	A. Langmaid	Concord, N. H.
Council Bluffs & St. Joseph	Myron Ellis		Council Bluffs, Iowa.
Connecticut River	John Mulligan	J. Hitchcock	Springfield, Mass.
Contoocook River			Concord, N. H.
Conn. & Passumpsic Rivers	Horace Alden	Horace Alden	Lyndon, Vt.
Cumberland Valley	A. S. Hull	C. W. Nitterhouse	Chambersburg, Pa.
Cumberland & Pennsylvania	W. L. Jordan	J. W. Sauerbach	Mt. Savage, Md
Central of Georgia	B. L. Boulineau	C. C. Millar	Savannah, Ga.
Central of New-Jersey	†T. W. Peeples	George Hackett	Elizabethport, N. J.
Central Branch Union Pacific	Wm. D. Rowley	W. A. Grubb	Atchison, Kansas.
Central R. R. of Iowa	H. P. Vedder	H. P. Vedder	Elden, Iowa.
Central Pacific	E. T. Perkins	E. T. Perkins	Sacramento, Cal.
D			
Dayton & Union	A. J. Keenan	J. F. Feicht	Dayton, Ohio.
Danbury & Norwalk	Charles A. Craig	Wm. W. Bedient	Danbury, Ct.
Dayton & Michigan	William Cullen,	W. H. Allison	Cincinnatti, Ohio.
Delaware, Lackawanna & Western	Walter Dawson	Robert McKenna	Scranton, Pa.
Des Moines Valley	Morris Sellers	R. E. Smith	Keokuk, Iowa.
Detroit & Milwaukee	B. Briscoe	B. Briscoe	Detroit, Mich.
Delaware & Hudson Canal Co	James Dickson	Thomas Orchard	Carbondale, Pa.
Dorchester & Delaware			Cambridge, Md.
Dubuque South-western	J. M. Williamson	J. M. Williamson	Farley, Iowa.
Dutchess & Columbia			Washington, N. Y.
E			
Eastern		J. P. Somerby	Salem, Mass.
Eastern	John Thompson		East-Boston, Mass.
East-Tennessee & Virginia	Jos. Armbruster	Jos. Armbruster	Knoxville, Tenn.
East-Tennessee & Georgia	Eli Hixon		Knoxville, Tenn.
East-Pennsylvania	J. M. Geary	Samuel Reeves	Reading, Pa.
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Erie Railway	James B. Grigg		
Erie Railway	H. L. Brown	C. A. Smith	Jersey City, N. J.
Erie Railway	M. E. Brown	M. Wilder	Buffalo, N. Y.
Erie Railway	W. E. Cooper	W. E. Cooper	Hornellsville, N. Y.
Erie Railway		W. E. Rutter	Elmira, N. Y
Evansville & Crawfordsville	John L. White	A. Sharra (fore'n)	Evansville, Ind.
Evansville, Henderson & Nashville	W. H. McCafferty	W. H. McCafferty	Nashville. Tenn.
European & North Am. (of Maine)	A. O. Bailey	J. H. Brown	Oldtown, Maine.
Erie & Pittsburg	John Young	John Young	Erie, Pa.
Eldora			Dubuque, Iowa.
F			
Florida	J. G. Chalk	G. Hernandez	Tallahassee, Fla.
Flint & Pere Marquette	Sanford Keeler	Sanford Keeler	East-Saginaw, Mich.
Fitchburg	Geo. A. Cooledge	Enos Varney	Charlestown, Mass.
Fitchburg & Worcester			Fitchburg, Mass.
G			
Grand Trunk	*Richard Eaton	J. W. W. McWood	Montreal, Canada.
Galveston, Houston & Henderson	William McBeth	E. J. Sherman	Galveston, Texas.
Grand River Valley		James Potts	Jackson, Michigan.
Grand Rapids & Indiana			Fort Wayne, Ind.
Great Western of Canada	*Wm. A. Robinson		Hamilton, Canada.
Georgia	William Hardman	Samuel Frost	Augusta, Ga.
Greenville & Columbia		J. O. Meredith	Helena, S. C.
H			
Hanover Branch	John J. Bingley	Henry Britcher	Hanover, Pa.
Hartford & New-Haven	N. Slingstand	F. Leppense	Hartford, Ct.
Hannibal & St. Joseph	H. A. Towne	H. C. Whiting	Hannibal, Mo.
Hartford, Providence & Fishkill	Edwin Garfield	V. D. Perry	Hartford, Ct.
Hackensack & New-York	Abra'm Angausen		Hackensack, N. J.
Hastings & Dakota	C. C. Clements		Hastings, Minn.
Housatonic	C. R. Morris	J. Ferris	Bridgeport, Ct.
Houston & Texas Central	Reuben B. Snyder	J. F. Rice	Houston, Texas.
Houston Tap & Brazoria	A. Malsch	R. H. Yeomans	Houston, Texas.
Huntington & Broad-Top Mountain	D. G. Gilchrist	M. Tellerhoof	Saxton, Pa.
Hempfield	T. Marsh		Wheeling, Va.
Hudson River	Wm. Buchanan	Wm. S. Town	New-York.
Hudson River	John Dykeman	Charles D. Mills	East-Albany, N. Y.
I			
Indianapolis, Cincinnati & Lafayette	H. M. Britton	H. M. Britton	Cincinnati, Ohio.
Indianapolis, Peru & Chicago	John McKenna	John McKenna	Peru, Ind.
Illinois Central	S. Hayes	C. Scoville	Chicago, Ill,
Iowa & Missouri State Line			Farmington, Iowa.
Iron	Perry Scott	Clem. Roetling	Ironton, Ohio.
Indianapolis & St Louis	C. E. Benton	C. E. Benton	Mattoon, Ill.
J			
Jeffersonville, Madison & Indiana	Reuben Wells	John Higgins	Jeffersonville, Ind.
Jackson, Lansing & Saginaw	Andrew Wilson	A. Wilson	Jackson, Michigan.
K			
Keokuk & St. Paul	P. R. Sutton	Wm. McElroy	Keokuk, Iowa.
Knox & Lincoln			Bath, Maine.
Kentucky Central	J. R. Ledyard	J. L. Hackenthorn	Covington, Ky.
Knoxville & Charleston			Knoxville, Tenn.
Kansas Pacific	Geo. W. Cushing	Geo. W. Cushing	Wyandotte, Kansas.
Kalamazoo, Allagan & Grand Rapids			Kalamazoo, Mich.
Kansas City, St. Joseph & Council Bluff	H. L. Cooper		St. Joseph, Mo.
L			
Lake Erie & Louisville	John Pero		Fremont, Ohio.
Lackawanna & Bloomsburg	Chas. Graham		Kingston, Pa.
Lehigh Valley	J. Kinsey		South-Easton, Pa.
Lehigh Valley	P. Hofecker	E. R. Brown	Weatherly, Pa.
Lehigh Valley	A. Mitchell	Mauch Chunk, Pa.	Delano, Pa.
Lehigh Valley	D. Clark		Hazelton, Pa.
Lehigh & Susquehanna	L. C. Brastow	L. C. Brastow	Wilkesbarre, Pa.
Lehigh & Susquehanna	Wm. H. Brown		Mauch Chunk, Pa.
Leavenworth, Lawrence & Gal	S. Philbrick		Lawrence, Kansas.
Lewy's Island	C. W. Button	Damase Merceir	Milltown, Maine.
Little Rock & Fort Smith			Little Rock, Ark.
Lebanon Springs			Burlington, Vt.
Little Miami, Col. & Xenia	J. H. Setchel	M. P. Ford	Cincinnati, Ohio.
London & Port Stanley			London, C. W.
Louisville, New-Albany & Chicago	Jacob Losey	Jacob Losey	New-Albany, Ind.
Long Island	Chs. A. Thompson	E. A. Olmstead	Hunter's Point, L.I.
Louisville, Cincinnati & Lexington	John Skidmore	Theo. G. Shaw	Louisville, Ky.
Louisville & Nashville	Thatcher Perkins	Isaac M. Owens	Louisville, Ky.
Lake Shore & Michigan Southern	†James Sedgley		Cleveland, Ohio.
Michigan Southern Division	James K. Taylor	John Kirby	Adrian, Mich.
Michigan Southern Division	B. H. Kidder.		La Porte, Ind.
M			
Macon & Augusta			Macon, Ga.
Maine Central	J. W. Philbrick		Waterville, Me.
Macon & Western	B. Pope Freeman	James A. Knight	Macon, Ga.
Manchester & Lawrence	Edward Studley	M. W. Dickerman	Concord, N. H.
Macon & Brunswick	M. Thornton	M. Thornton	Macon, Ga.
Maysville & Lexington			Maysville, Ky.
Marietta & Cincinnati	E. Bosley	E. Bosley	Chillicothe, Ohio.
Memphis, Clarksville & Louisville			Clarksville, Tenn.
Memphis & Little Rock	D. R. Wing		Little Rock, Ark.
Memphis & Charleston	Michael Burk	A. W. Drew	Memphis, Tenn.
Memphis & Charleston	L. M. Sellars.	Thomas Varun	Huntsville, Ala.
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Maryland & Delaware	Samuel Peters		Greensboro, Md.
Mississippi, Gains. & Tus			Gainsville, Ala.
Midland Pacific			Nebraska City, Neb.
Milwaukee & St. Paul		Wm. E. Kettridge	Milwaukee, Wis.
Milwaukee & St. Paul		John Baillie	Milwaukee, Wis.
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Montgomery & West-Point	J. McVey	W. H. Daniels	Montgomery, Ala.
Montgomery & Eufaula	James McCann	I. E. Holmes	Montgomery, Ala.
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Mobile & Ohio	G. D. Linning	John McHugh	Mobile, Ala.
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Nashville & Chattanooga	John U. Eastman	J. G. Sawyer	Nashville, Tenn.
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New-Bedford & Taunton	Robert Chase	Robert Chase	New-Bedford, Mass.
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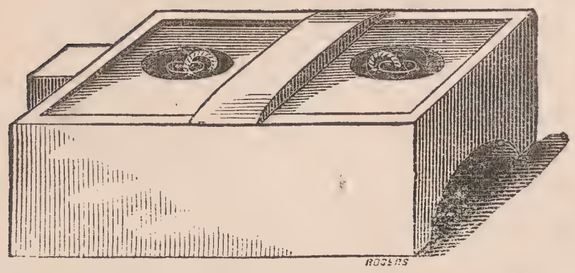

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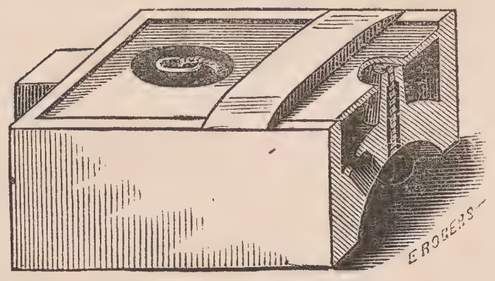

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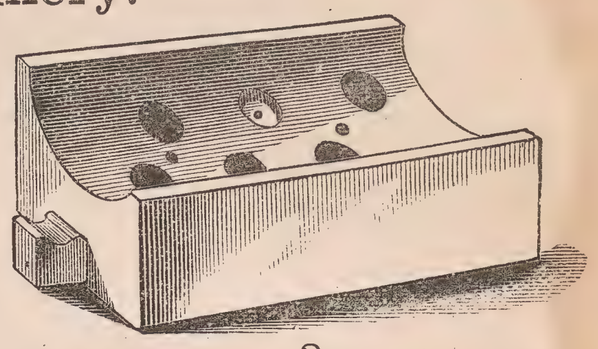

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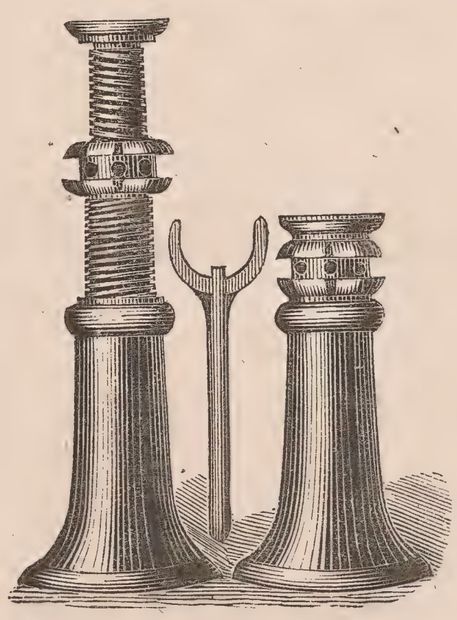

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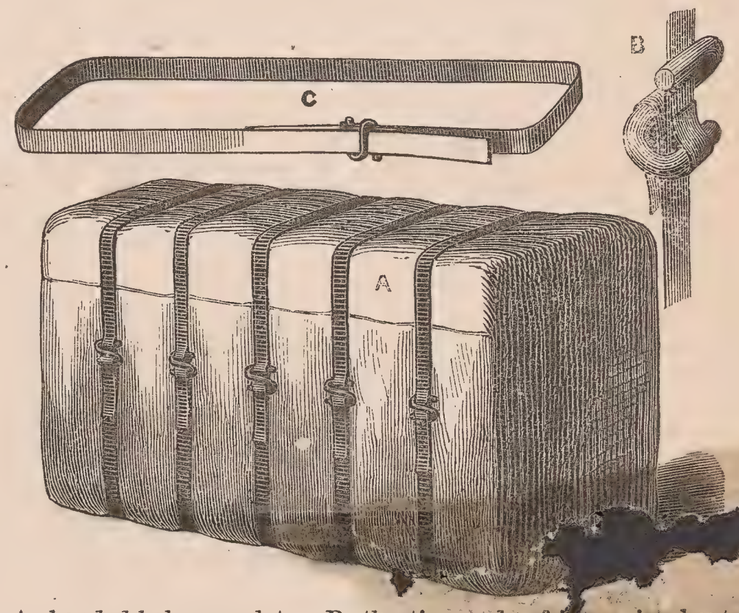

A, banded bale complete. B, the tie, made of iron wire, bent in the form of an S, and showing the end of the iron band bent over the centre of the tie, as it is applied to the bale at the plantation. When it is subsequently compressed for shipment, the band is drawn through the tie, the surplus cut off, and the tie flattened by the blow of a hammer, holding the bale firmly.

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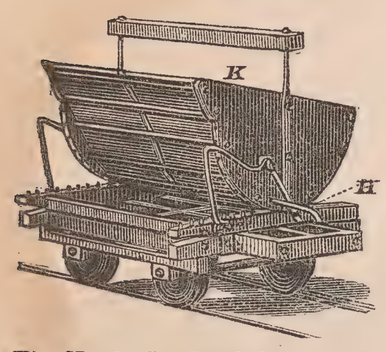

Fig. No. 1, Car Loaded and at Rest.

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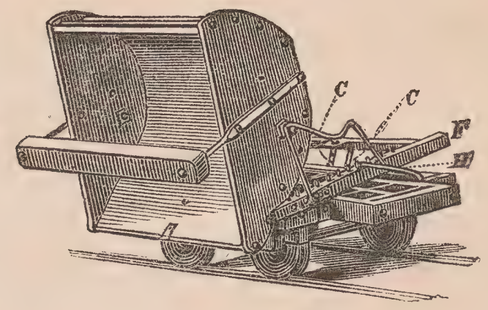

Fig. No. 2, Car Dumped.

TO DUMP THE CAR.

The brakeman seizes the lever, H, and raises it about a foot, thus releasing the hopper from the catch, C, and the tilting frame, F, from the catch, C, when the hopper, K, yields to the force of gravity and rolls over to the position shown in Fig. 2.

TO REPLACE THE HOPPER IN READINESS FOR ANOTHER LOAD.

The brakeman bears his weight on the up-end of the tilting frame, F, forcing it down to its place, when the hopper rolls back to *its* place where it is held by the catches, C and C.

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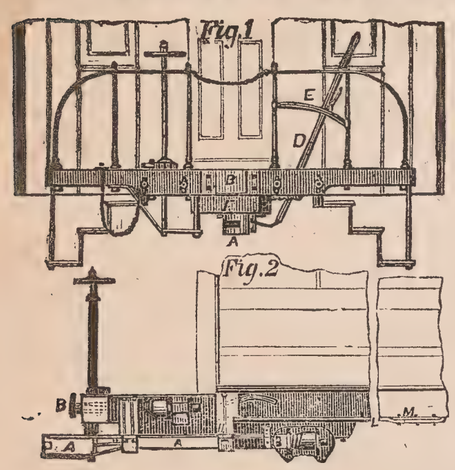

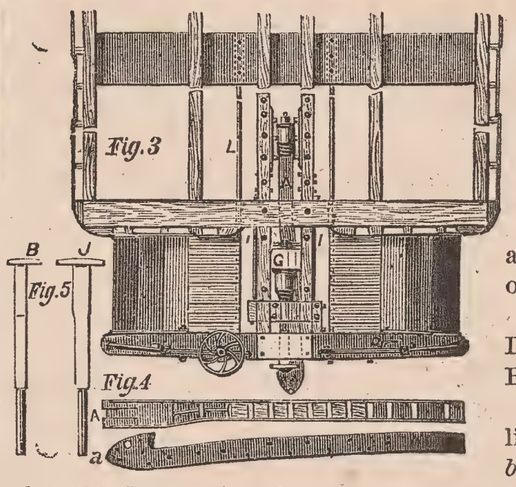

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DESCRIPTION.

Figure 1 is an elevation; Figure 2, a longitudinal section; Figure 3, a plan of an end of a car to which the arrangement has been applied; and Figures 4 and 5 show top and side views of the "Hook" and "Buffer," drawn on a larger scale than that of Figures 1, 2, and 3.

The letters refer to the same parts in all the figures. A is the coupling "Hook," B the "Buffer," C the "Stop," D the "Lever," E the "Quadrant Ratchet," F the "Truss Beam," G the "Spring Beam," H the "Suspender Beam," I the "Upward Trusses," K the "Main Spring," L the "Downward Trusses," and M the "Bolster."

The Platforms, instead of being located below the centre line of the main sills of the cars, are placed *in* that line, and held there by the Trusses I and L, so that the point of contact (in Buffers B) is *in* the said centre line and *not below* it.

The coupling "Hook" A is attached to the draw spring the same as the ordinary draw head, and at the same height above the track, but in such a manner that the outer end is free to move laterally for a short distance. The Coupling Hook projects beyond the platform. The Stop C is placed under the Buffer Beam to prevent accidental uncoupling. When two cars are brought together, the Coupling Hooks, from *their shape*, push each other aside, until the Buffers B are compressed hard on the Buffer Springs, then—*the points of the hooks having passed each other sufficiently far*—the Hooks are carried forward by their main-springs, and thus the "*Coupling*" and "*Compression*" are both effected automatically *and at the same time*, and without the use of links and pins. When two cars are thus coupled together, the *head* of the *Hook* of each car is under the Buffer Beam of its opposite car, and the platforms are close together, (about 4 inches apart.) The effect of this is, *one platform can not be forced over the other*, nor can a *child* fall between the platforms; the dust and rain are nearly all shut out; the "Compression" makes the train run steadily, and prevents all jerking at starting and stopping.

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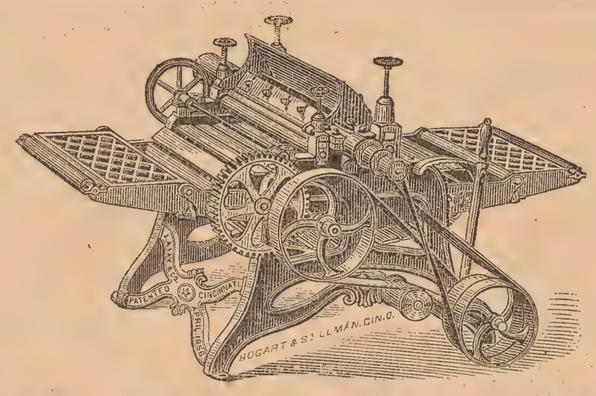

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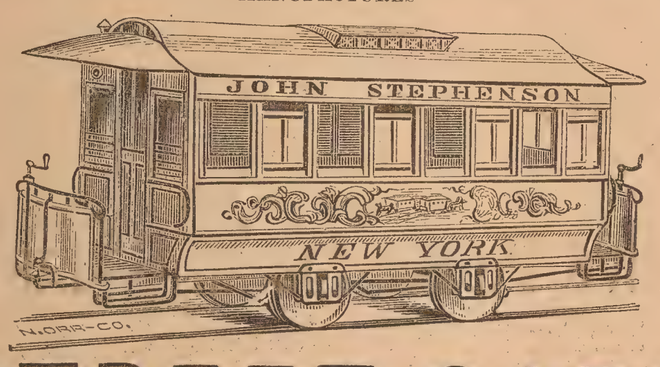

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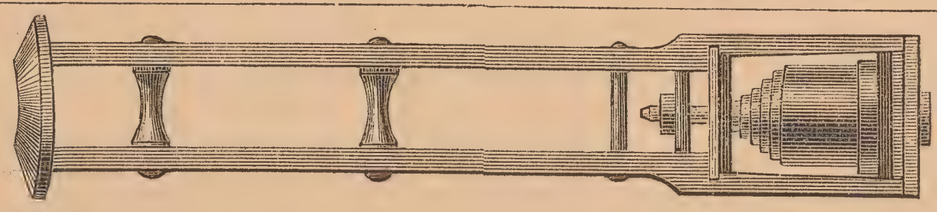

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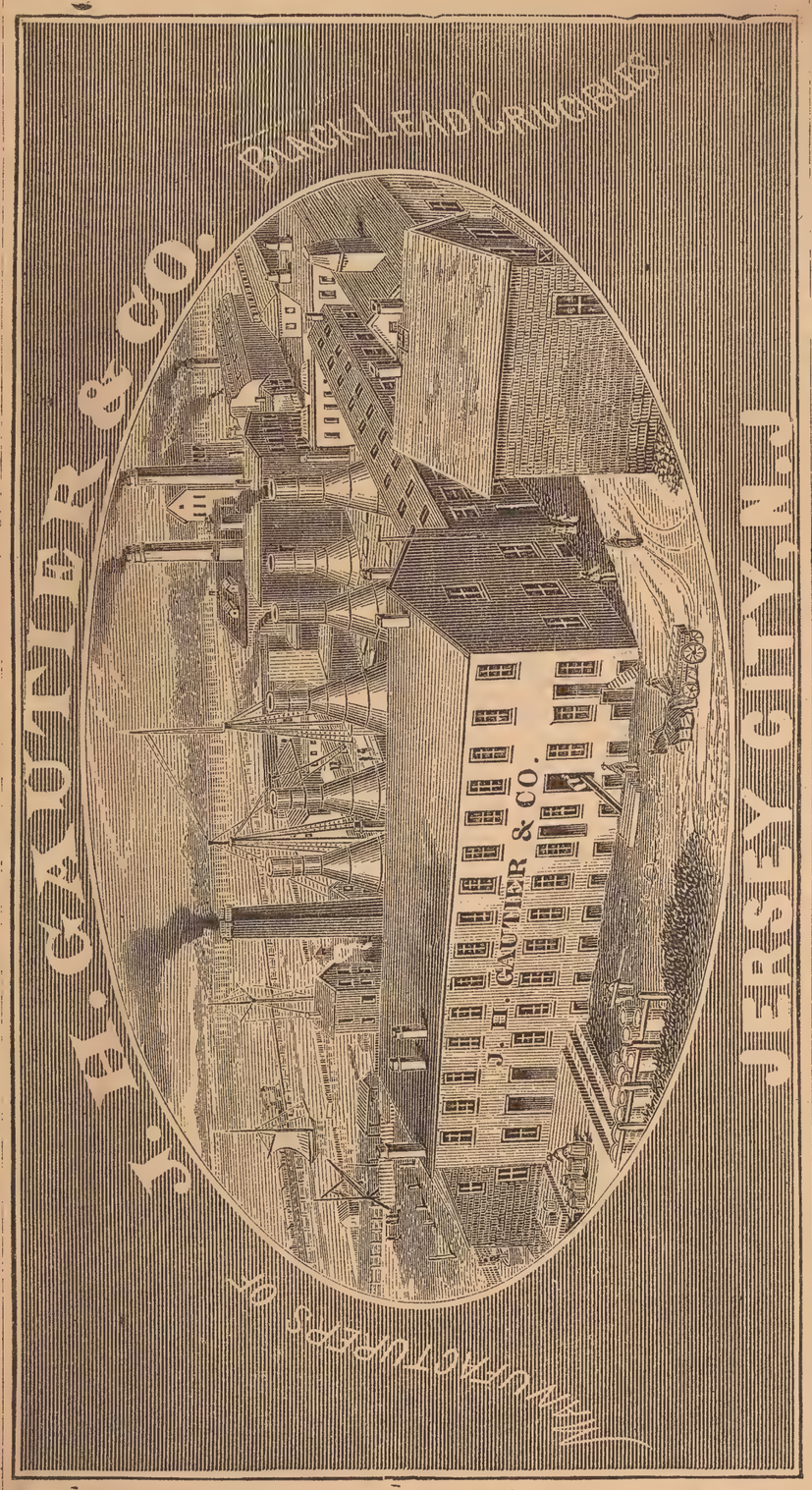

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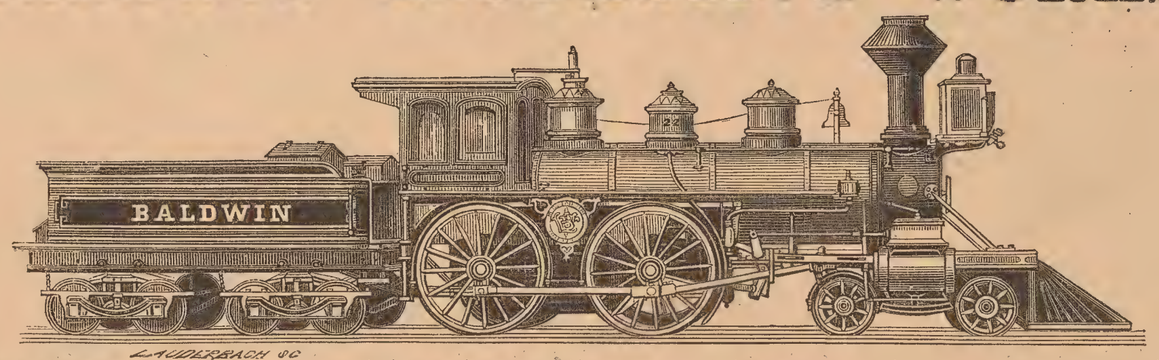

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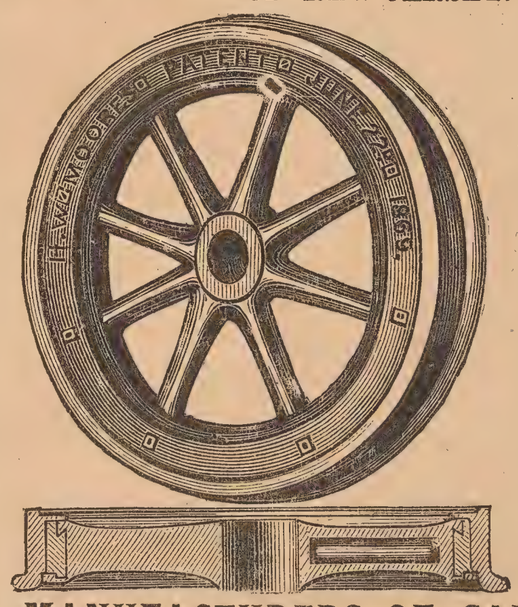

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Car-Building in California.

WE learn from the San Francisco *Spirit of the Times* that the Kimball Car and Carriage Company, of that city, have nearly completed a magnificent sleeping-car, which in its materials and construction will be highly creditable to the resources of California, and to the skill and ability of the mechanics of San Francisco. The car is sixty-seven feet in length, including platforms, and ten in width, and is made entirely of material from the Pacific coast, its interior wood-work consisting of no less than thirty-five different kinds, and polished to such a degree as to give a reflection almost equal to a mirror. Neither paint, carving, nor gilding has been employed upon any part of it, and throughout there is not a splice or a joint.

The outside paneling is of *prima vera* wood, a species of hard mahogany, which is impervious to any change of weather—the heat neither expands nor cracks it, nor does the cold contract or chip it off. It is the most durable wood in use, and, on account of the qualities of which we have spoken, most valuable for the use to which it has now been put. In the car there are but four compartments. The two in the middle of capacity to accommodate ten each, and those at each end capable of furnishing room for six each; and each compartment is provided with water-closet, stationary wash-stand and dressing-room, rendering them as private as if in one's house. The mouldings of the car are of California rosewood, the frame of the same of Oregon pine, and the covering of Oregon cedar. The inside of the roof and dome are to be ornamented with handsome pictures now being prepared for them. The cornice mouldings are of *mesquite* wood, and of *lignum-vitæ*. The base mouldings are of the same. The cornice panels are of laurel. The window-sashes are of *prima vera*, and the windows, of which there are thirty-six, are two feet in width by three feet three inches in depth, the upper portion of the lights being of splendidly embossed glass. The upper dome is trimmed with *madrone* wood, the mouldings are of *rosewood* and *mesquite*, and the main panels and styles are of laurel.

All the mouldings on the inside are of nickel plating, which never tarnish, not even if steeped in vinegar, and do not require any rubbing or polishing. This is a great invention, and the patent right for this coast has been purchased by the Kimball Car and Carriage Manufacturing Company. The upholstery work of the car of which we have been speaking will be magnificent, and the different rooms will be furnished in crimson, blue, green, and drab; and the carpets, which are of the richest descriptions of Axminster and Royal Wilton, as well as the curtains and other ornamentations, will match in color. The sofas will be trimmed in crimson and green plushes of an entirely new style, and the springs of the seats are also of an entirely new description, being elliptic, made of thin, flat, watch-spring steel, being three layers thick, compressed into the form of an egg. There are forty-two in each seat, which are decidedly the most comfortable and serviceable we have seen. The car rests on two six-wheel trucks, with the patent Cooper India-rubber wheel, the packing between the two flanges forming the hub being of India-rubber, and the axle being put in between the two flanges of the hub in such a manner as to prevent any vibration or concussion of the car, the truck being an improvement of Mr. Welch's, the Master Mechanic of the Central Pacific Railroad Company.

In addition to this car the company have been constructing other cars, which, though not up to the standard of beauty of the splendid one described, are equal to it in point of care in construction and durability. They have one very elegant passenger-coach, forty-five feet in length and ten in width, capable of seating sixty passengers. The outside is of *prima vera* and *mesquite* wood, paneled alternately, three and a half inches wide, and no two panels alike. There are thirty windows in the car. The car will be finished up very handsomely in every respect. A very fine car is also in the shop, not yet completed, for Colonel Peter Donahue's Sonoma Railroad. It is a full passenger-coach, paneled on the outside, and painted. The inside will be finished in maple, black-walnut, *mesquite*, and laurel.

Street-Cars with Roof-Seats.

THE *American Railroad Journal* describes as follows certain novel street-cars which have been built lately by John Stephenson & Co., of New-York:

"They differ from those generally in use in this city, by being provided with broad winding stairways from each platform to the roof, where seats are ranged in equal number to those in the body of the car; the entire car-load seated thus being forty-four persons. Upon the sides of each car is the inscription, 'Tramway de la Bocay Barracas.' They are intended for an English company, and are to be used in the city of Buenos Ayres. With the exception of being slightly narrower and possessing the roof accommodation mentioned, these cars are the same as those used in this city, and will cost, when delivered at their destination, eleven hundred dollars each. Thirty is the number of the present shipment, fifty having preceded them. The same firm lately shipped an omnibus to the Canary Islands, and are filling like distant orders. The roof-cars now in use in London were made by John Stephenson & Co., but differ from the present make in only being provided with a single ladder, which is moved as occasion requires to the rear platform of the car."

WHOEVER is afraid of submitting any question, civil or religious, to the test of free discussion, is more in love with his own opinion than with truth.

Warming and Ventilating Cars.

A WRITER in the *Railroad Gazette* speaks of matters embraced in the above caption as follows:

"Even with the best of management with coal or wood-burning heaters, it is difficult to maintain a uniform temperature throughout the entire length of a car, and on this account steam heaters would seem to be preferable. Another serious objection to coal or wood burners is the almost certain destruction of cars by fire in case of accident. Several devices for heating by steam have been patented, some of which have been so arranged as to make use of exhaust-steam; but this arrangement is attended with many inconveniences. Engineers will generally oppose the plan of heating by running flexible pipes from the smoke-box to the rear of the tender, from whence other pipes pass through the train, partly on account of its inconvenience, and partly on account of its uncouth appearance. In point of economy, heating by steam seems to have many advantages in its favor; but it is a question whether it can be best accomplished by taking steam direct from the locomotive boiler or by using exhaust-steam. It is often necessary to use all the steam for propulsion, and taking it direct from the boiler for heating purposes at such times would be decidedly objectionable. All things considered, *any* contrivance for taking steam from the locomotive-boiler, either from the exhaust or otherwise, for the purpose in question, would be a constant source of annoyance to the engineer and fireman, whose duties and responsibilities should not be increased.

"It would not be a costly experiment to fit up a small room in a baggage-car with a boiler and other necessary apparatus for generating and conducting steam through the train, the whole to be under the charge of a single person, whose other duties would not interfere with its proper supervision. If the boilers were located properly, its supervision would not interfere with the ordinary duties of a brakeman. In regard to the economy of such an arrangement, no doubt one half the fuel required to heat a train in the ordinary way would generate steam sufficient for the purpose. The first cost of a steam-heating apparatus would exceed somewhat that of the ordinary coal or wood-burning stoves; but the saving in fuel, together with other advantages to be derived from the use of steam, would be sufficient to warrant its use. A fire-proof steam-room could be fitted up in a baggage-car, so that in case of a collision or run-off no fire could be communicated to the passenger-cars, and also so that the car in which the steam-room is located would be safe from fire. It should be borne in mind, however, in fitting steam-pipes, that it is dangerous to have the pipes in contact with wood or other combustible material, or even very close to it, unless protected in some thorough manner. Fires have sometimes originated in factories and other buildings heated by steam not only where pipes were in actual contact with wood, but when two or three inches from it. Flooring will

become charred after long-continued use of steam-pipes beneath it, and pieces of wood which had been within two inches of steam-pipes for a considerable length of time and been removed have been ignited at a very low temperature. Experiments have proved that heating by steam is unsafe unless the pipes in passing through walls or partitions are fitted with non-conducting material; but when pipes and their surroundings are properly fitted, this manner of heating may be considered entirely safe. It is certain that a more uniform temperature may be maintained throughout the entire car with steam apparatus than by the use of either wood or coal-burning stoves. Connected with the health and comfort of railroad passengers, nothing has taxed the brains of inventors and railroad men to such an extent as the thorough ventilation of cars. Scientific men have also given this matter much attention, and, although the results of their labors have been in a measure satisfactory, there yet remains much to be done in this direction. It is hardly to be expected, however, that any system of ventilation will ever be discovered that will be satisfactory to a large class of railroad travelers whose principal business is traveling and fault-finding. It is no easy matter to admit fresh air to the interior of a passenger-coach and at the same time exclude sparks and cinders. It is not a difficult matter to provide means for the escape of foul air without admitting dust, and it is not that cars are not provided with apparatus for that purpose that gives cause for complaint, but it is improper management of such apparatus as is usually provided.

"Recent improvements in spark-arresters and smoke-consuming apparatus will somewhat lessen the difficulties heretofore encountered in ventilation. It is reported of a recent trial of a spark-arrester on a road in Massachusetts, that on a trip of forty-five miles, fourteen bushels of sparks, cinders, etc., were collected, or about ten quarts per mile. When proper ventilation is secured, and warming apparatus brought into use, whereby a uniform temperature may be produced, and maintained throughout the entire car with entire safety from fire in case of accident, the passenger accomodations of American railroads will be very satisfactory, and may be said to be complete."

The Love of the Beautiful.

WHAT are half the crimes in the world committed for? What brings into action the best virtues? The desire of possessing. Of possessing what?—not mere money, but every species of the beautiful which money can purchase. A man lies hid in a little, dirty, smoky room for twenty years of his life, and sums up as many columns of figures as would reach half round the earth, if they were laid at length; he gets rich; what does he do with his riches? He buys a large, well-proportioned house; in the arrangement of his furniture he gratifies himself with all the beauties which splendid colors, regular figures, and smooth surfaces can convey; he has the beauties of variety of association in his grounds; the cup out of which he drinks his tea is adorned with beautiful figures; the chair in which he sits is covered with smooth, shining leather; his table-cloth is of the most beautiful damask; mirrors reflect the light from every quarter of the room; pictures of the best masters feed his eyes with all the beauties of imitation. A million of human creatures are employed in this country in ministering to this feeling of the beautiful. It is only a barbarous, ignorant people than can ever be occupied by the necessities of life alone. If to eat, and to drink, and to be warm were the only passions of our minds, we should all be what the lowest of us all are at this day. The love of the beautiful calls man to fresh exertions, and awakens him to a more noble life; and the glory of it is, that as painters imitate, and poets sing, and statuaries carve, and architects rear up the gorgeous trophies of their skill—as every thing becomes beautiful, and orderly, and magnificent—the activity of the mind rises to still greater and to better objects.—*Exchange.*

The Movement of Railway-Wheels around Curves.

A CORRESPONDENT of the *American Artisan*, in alluding to the discussion as to "how the outside wheel of a railway-car manages to keep up with the inside one while having to go a greater distance, yet turning around the same number of times," gives his views upon the matter, and incidentally a little bit of historical information which may be of interest to wheel-makers. He says:

"Now, permit me to say to your correspondent that the wheel on the outside of the curve does travel the greatest distance, and that the wheels are of equal diameter, but neither of them slips upon the track; but you will see, upon examination, that the wheels have a larger diameter at the base of the flange than at its outside circumference, and that when the wheels are passing a curve, the outside wheel travels on its largest diameter, while the wheel on the inside travels on its smallest. At the time when the railway was being built from Boston to Lowell it was laid straight, because they were unable to turn a curve, as their wheels were cast and then turned perfectly flat; and soon after the completion of the road, a boy, who was then an inmate of the Boston poor-house, told them how to overcome the difficulty, and his plan has been used ever since."

To which the editors append: "Our new correspondent agrees with every one else who has taken part in this controversy in saying that the wheel on the outside of the curve does travel the greatest distance. The question was, Whether the two wheels revolve the same number of times? When both are fast on the axle, as is common, they must revolve equally, and in such a case one does slip on the track. The coning of the wheels spoken of by our correspondent only partially obviates the slipping."

The Pneumatic Car.

A PRELIMINARY trial trip of the pneumatic car took place Tuesday night in the presence of a few stockholders. Some few hours were consumed in dragging the car through the mud and over the cobble-stone pavement to the New Levee street track. The hard usage it was thus necessarily subjected to injured one of the connections, allowing an escape of motive power, so when finally in position on the track, ready to start, the gauge recorded a pressure of only 96 pounds, instead of 300, as designed. It was now about 1½ o'clock. Some forty people crowded into the car, the engine started, and with a cheer away it went toward Canal street at the rate of about fifteen miles an hour. The engine soon proved itself powerful enough to drag the Pontchartrain train, the trip plainly demonstrating that one of half the size and power would be all that is required for propulsion of street-cars. Twice on the way down the car ran off the track with excess of speed, and on each occasion, once when the gauge only recorded twenty pounds pressure, started the crowded car with perfect ease from a point of inertia. Near Canal street its breath began to die out, and finally stopped entirely, within a stone's throw of that thoroughfare, having traversed a distance of about half a mile. No expectations were entertained by the engineers of making a longer trip with the limited pressure, 250 pounds being requisite for a trip of six miles. The experiment Tuesday night was intended mainly to demonstrate the principle, together with its draught-power and attainable speed, and in this respect its result proved highly satisfactory.

One by one, for over two years, difficulties have been developed and conquered, until now nothing but careful workmanship seems to stand between it and supreme success. With perfect connections and all the proper appliances an improvement so valuable is entitled to, the next experiment, which will take place, it is said, in a few days, ought to fully demonstrate the skill, foresight, and fame of its inventor. Each experimental trip, so far, has fulfilled the conditions promised by Mr. Whalley, and he promises it shall travel over an entire city route at its next trial.—*New-Orleans Times.*

Rolling-Machine for Shaping Axles.

[Paper read before the Mechanical Section of the British Association by Mr. Alfred Bowater.]

THE purpose which the machine now to be brought under your notice is intended to subserve is that of rolling or shaping axles suitable for railway carriages. At the present time, such axles are hammered into the required form by means of the forge or steam hammer. In order to produce the varied dimensions, the hammer-faces are made with grooves of suitable forms, so that the workman during the progress of his work, by moving the forging or axle from one groove to another, succeeds in reducing the material, whether iron or steel, to the shape required. The process is slow and tedious, while the labor is continuous and expensive.

The question has often been put, "Why are not axles for railway carriages rolled instead of hammered?" and remarks passed to the effect that were a machine introduced capable of rolling axles suitable for railway purposes, instead of the present method of hammering them, a desirable improvement would be effected. The axles so produced should be superior in quality, owing to the fibre being worked in the proper direction, more uniform in size, and considerably reduced in price. The demand for all kinds of railway material must, for years to come, keep steadily increasing, and an improvement, however slight in itself, is of considerable importance, if applicable over the vast extent of railway operations.

Such suggestions as the foregoing led to the consideration of the design for the present machine now offered to your notice, which machine I trust and believe capable of effecting a considerable improvement as well as saving in time and cost over the methods now employed in the manufacture of railway axles.

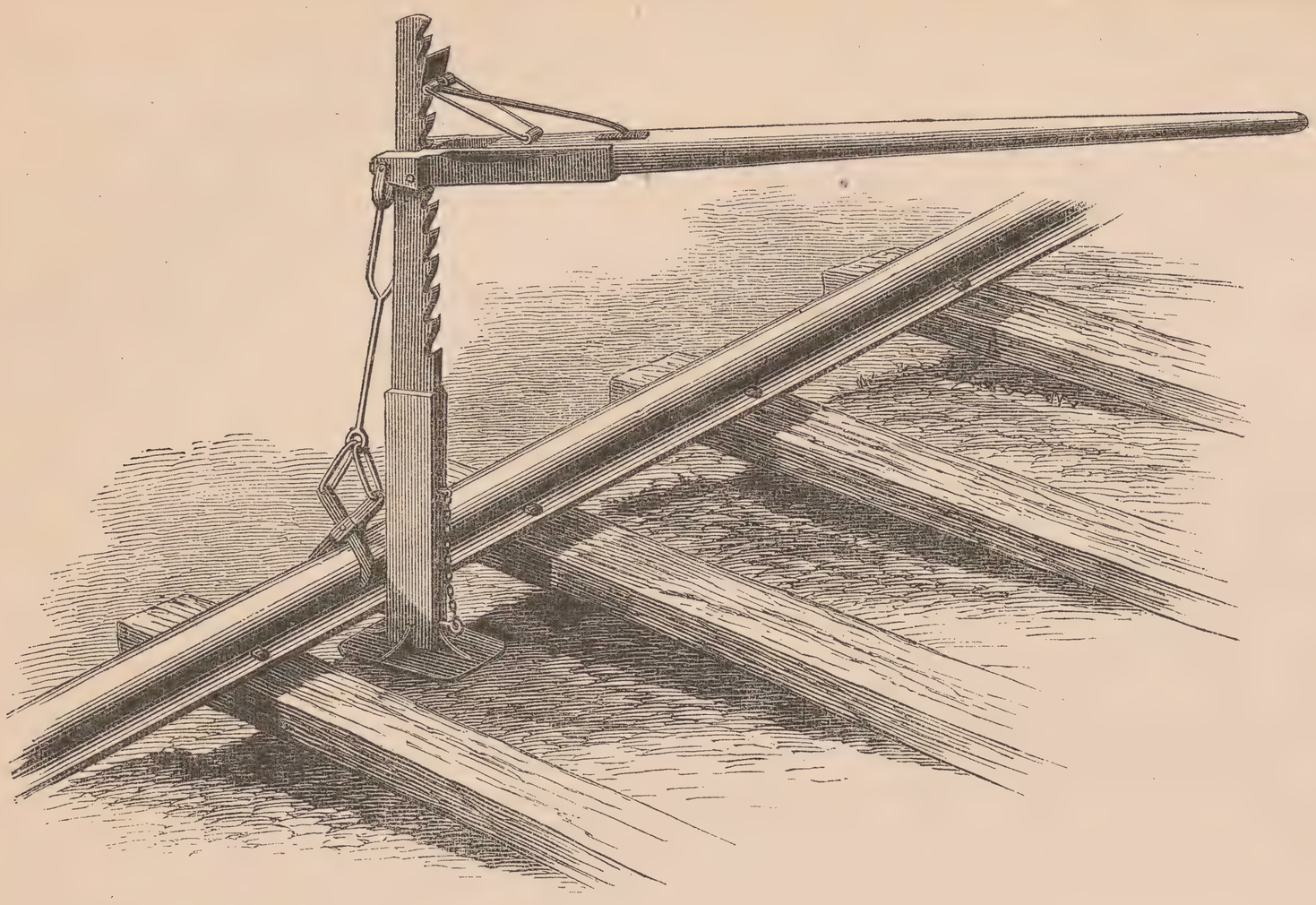
The machine consists of three rolls about sixteen or eighteen inches in diameter, supported by the usual standards, one at each end. The two rolls are placed on the same line, level with the base of the standards. The third roll is placed above, and so disposed that the peripheries of the rolls can be brought closer, or separated by raising or lowering the top roll. Powerful screws are fixed in the standards for this purpose. In the employment of this machine it is essential to provide a round bar of iron or steel, which should be cut exact to length, and to the weight required. This bar should be rather larger in diameter than the thickest parts of the axle when finished. The bar so prepared requires to be heated over, and when ready, to be placed lengthwise between the rolls and parallel with their axles. The rolls are geared together so as to rotate in the same direction. So soon as the heated bar is placed between the rolls, the rolls are, by means of the screws, gradually pressed closer together, thereby reducing the bar or blank to the required dimensions. The portions of the rolls which form the journal of the axle press first upon the blank, reducing the diameter at those parts, next the rolls bear upon the middle of the blank, and by degrees along its entire length.

In reducing the diameter of the bar, it necessarily extends its length. This elongation would amount in ordinary axles to from fourteen to eighteen inches. To allow for this elongation, those parts of the rolls which form the journals are arranged to slide laterally with the ends of the axle, at the same time the rolls are continuously screwed closer together until the axle is reduced to the size required.

Such is a brief description of this machine, which up to the present has not been tested.

A CEMENT WITHSTANDING HEAT AND MOISTURE.—Pure white-lead, or zinc-white, ground in oil, and used very thick, is an excellent cement for mending broken crockery-ware; but it takes a very long time to harden. It is well to put the mended object in some store-room, and not to look after it for several weeks or even months. It will then be found so firmly united that, if ever again broken, it will not part on the line of the former fracture.

Feb 1871



Batchelor's Patent Track-Lifter.

THE engraving herewith presented conveys a very clear idea of the working of Batchelor's patent track-lifter. The device is a decided improvement upon the various methods now in use for raising the track, including both rail and ties, for the purpose of ballasting or repairs. It is easily transported, and can be adjusted and worked with the greatest facility, lifting the rail and holding it at any required height. As seen in the engraving, it stands inside the track, and can be used in narrow cuts and tunnels as conveniently as elsewhere. In working it, the foot of the cast-iron rack is placed under the rail; the lever, to which is attached the lifting-tongs, is then raised over the top of the rack and dropped into one of the notches sufficiently low for the tongs to grasp the top of the rail; then the lever is pressed down until the track is raised high enough to be caught and held by the pin at the lowest part of the rack; then the lever is raised another notch, and so on, until the track is lifted to the required height. For any intermediate height between the pin-holes, the pawl on the top of the lever can be used. So effectually does the machine do the work of lifting and holding the track, that the services of two men in every gang, as required by the usual methods, may be dispensed with, which is a consideration in the matter of expense which railway managers and track inspectors are not likely to overlook. We are persuaded that a trial of this device is all that is necessary to demonstrate its merits and secure its adoption upon all roads. The track-lifter, or any information in regard to it, may be obtained of Vose, Dinsmore & Co., No. 1 Barclay street.

Iron Railway Cars.

THE man who witnesses in his youth the bringing forward of a good idea in engineering, may often, but not always, see it stand a chance of adoption in his old age. An apt illustration of this is found in the truth that in steam practice the use of high piston speed, high pressure, and great expansion—now advocated by our most experienced experts—may be found urged and suggested with almost equal warmth several decades ago. One equally *apropos* to our proposition is found in the history of iron cars for railway purposes, in this connection the topic of a few remarks. These were proposed a score of years since in the form of models, and urged in newspaper paragraphs; but although we believe they have in one or two instances been tried, we do not think that there is one in use in the country, although the reiterated destruction of cars in the event of collision furnishes one of the strongest arguments that can be adduced of the comparative inutility of wood and the superiority of metal for the purposes indicated.

It is, indeed, somewhat a matter of surprise that the tendency everywhere manifest in mechanical construction to substitute iron for wood should make such slow progress in a direction so important as that of railway improvement. In the mines of Nevada and California, wooden cars for the carriage of ore and rock were formerly employed; but during the past few years, iron ones have taken their places. There is no good reason why the same substitution should not be made on railways. This, we are informed, is to some extent being brought about abroad, where the solidity of the permanent way and the rigid police system of railway supervision render much more infrequent than with us the direful results of wrecked and burning cars. Iron coal-cars were in use in Switzerland twenty years ago, and fifteen years since were made and used by hundreds in France. At a later date, the Swiss adopted cattle and baggage-cars of the same material; and we have somewhere seen a statement that passenger-cars made of iron—except the seats, window-sashes, and the like—were common in the same country.

The differences between American and European railway practice and construction are so great that each constitutes almost an art by itself, and the practitioners in each have a by no means exhaustive knowledge of the other. It is quite possible that greater attention to this matter of metallic cars as made abroad would lead to a much more ready appreciation of the merits of iron car construction. If the system, however, should prove to be yet incomplete, there need be only the promise of adoption, and improvements capable of meeting all possible defects will be quickly forthcoming from the same class of inventors who have made American cars the most luxurious in the world, and who need only a suitable incentive to make them the safest.—*American Artisan.*

CLEANING OIL-PAINTED SURFACES.—Take a piece of soft flannel, put it in warm water, and squeeze it till it feels dry; next dip it gently on to some very finely pulverized French chalk, and rub the painted surface with the flannel; the effect will be the removal of all dust, greasy matter, and dirt; the surface is next washed with a clean sponge and water, and dried with a piece of wash-leather. This method does not injure the paint like soap, and produces a very good result.

Experiments in Street-Car Propulsion.

How to run street-cars without steam or horses is a problem now exciting much attention and provoking projects and experiments almost without number. Nor is this other than it should be. There is scarcely a city of any size in the civilized world where such improved means of passenger transit would not be desirable, and in many absolutely necessary and certain of adoption. Referring to New-York as an example, it is an under-estimate to say that Westchester County alone could well afford to pay a bonus of ten millions of dollars for any system by which cars could be run without the expense of horse-power, or the danger and inconvenience of steam, between her further edge and the City Hall. Such being the importance of the subject, any practical trials relating thereto, however made, and no matter how ill-digested, are worthy of note as showing the actual value of proposed plans and as suggestive of additional improvements. We find in our exchanges accounts of two recent experiments in the line indicated, one made at New-Orleans and the other at Chicago.

The trial at New-Orleans was with an endless wire-rope applied to the hauling of cars on the street railways, and was made under the direction of General G. T. Beauregard. An old locomotive was jacked up, a wooden drum was bolted fast upon one of its wheels, and this drum gave motion to the rope; the latter lay between the rails, supported at intervals by guide or friction-pulleys, and at its remote end passing over a wheel furnished with a balance-lever, so arranged as to strain the rope to compensate for inequalities in its tension, caused by the attachment and detachment of cars. The cars are furnished with gripping pulleys actuated by a lever to grasp the rope, and these pulleys are themselves brought stationary with reference to the car by applying a friction-brake. This enables the car to be started gradually or to be moved at any desired speed less than that of the rope itself. This part of the plan seems to be identical with one illustrated on page 321, Vol. V., of the *American Artisan*, the invention of a New-York City projector, who may congratulate himself on the favorable report of its operation; our authority stating that the car could be "started, run, and stopped at will," and that "the experiment was a complete success."

The other experiment—that conducted at Chicago—related to the old and well-known method of storing compressed air in tanks, and using it in lieu of steam in working the engines. In the present instance, four tanks of sheet-copper brazed with hard solder at the joints were arranged upon the top of the car, and connected with the engines placed underneath the seats. Each tank contained one hundred and fifty cubic feet of air, compressed to exert a pressure of two hundred and fifty pounds per square inch. Few details of the affair are given, except that it passed off without mishap, and that the distance traversed, three miles and a quarter, was made in about thirty minutes. This, about ordinary mail-coach speed on country roads, is hardly up to the standard that will eventually be required for city transit; but it is sufficient to show that the project has some promise in it, the more especially as there is no reason why air compressed to twice the pressure mentioned may not be used.—*American Artisan.*

ANOTHER CEMENT.—Pound half an ounce of resin and four ounces of gum-mastic; put them into a pipkin on the fire to melt; stir them well. To this add about half an ounce of finely-powdered glass, and half an ounce of quicklime; stir the whole well together. When nearly cold, form it into sticks, on a stone, in the same manner as sticks of sealing-wax are formed. When you want to cement any article, heat the broken edges sufficiently to melt your cement, which rub thinly on both edges; bring them accurately together; press them close, and let them cool. If this be carefully done, your work will sooner break in any other part than where the cement has been applied.

The National Car-Builder,

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CORRESPONDENCE.—*We cordially invite the coöperation of the railroad public in affording us the material for a good mechanical paper. Articles relating to rolling stock and machinery, by those practically acquainted with those subjects, will be gratefully received. All communications must be addressed to Vose, Dinsmore & Co., No.* 1 *Barclay Street.*

The name and address of the writer must accompany all communications designed for publication.

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ENGRAVINGS AND ILLUSTRATIONS.

We would invite the attention of Master Car-Builders and others to the advantages to be derived from publishing in THE NATIONAL CAR-BUILDER *engravings designed to illustrate the various features and details of car construction, and especially such improvements as can not otherwise be clearly presented. We will procure cuts to be made in the best manner from drawings or models that may be sent us, and charge only for the cost of engraving, inserting the same in our paper with suitable descriptive details, without charge. The cuts thus made by us, or that may be sent us for use in* THE NATIONAL CAR-BUILDER, *will of course be returned promptly to the owner.*

War of the Gauges.

THE gauge discussion is continued as vigorously as ever in the railway journals; but the arguments are so elaborate, and embrace such an array of statistics and details, that our small space will not allow even a synopsis of them. The advocates of the narrow gauge are enthusiastic and confident, and present reasons that are plausible if not convincing; while their opponents are no less expert and industrious in ciphering out conclusions of an opposite kind. As the question now stands, it appears very distinctly to have two sides. The problem to be solved would seem to be the comparative utility, for general purposes of railway transportation, of the narrow and standard gauges—say the three feet six, and the four feet eight and a half. To arrive at any thing like reliable accuracy, involves so many considerations pertaining to the details of construction, equipment, operating expenses, wear and tear, traffic, dead-weight, the size, speed, and capacity of trains, and a hundred other things incidental thereto, that nothing short of facts derived from experience can be accepted as conclusive. Theories are deceptive and liable to mislead—pet theories, especially. Our extended territory, the prevailing activity of railway enterprise, and the want of adequate capital, necessitate the greatest disproportion between the length of a road and its actual cost; and the narrow gauge is regarded with favor, on account of its alleged cheapness, in localities and districts seeking connection with main lines, and by those who have tied up capital in non-paying or broken-down projects. As experience is the only test of theory, we trust the narrow gauge may be tried in divers localities, upon such a scale and under such conditions as will effectually test its merits; but we think the established lines of standard or broad gauge will not be unduly precipitate in adopting an innovation so important until its advantages are more manifest than they now appear to be.

Palace Street-Cars.

SOME member of the New-York Legislature has originated the idea of a palace street-car, whether in sober earnest or as a slur upon the performances of Mr. Pullman, we are unable to say. Whatever may have been the design, we are inclined to treat the project seriously. The same idea has occurred to ourselves, and we dare say to others, who have been reminded of palace-cars by sheer force of contrast while traveling, evening and morning, up and down our city avenues. We thought how nice such a car would be, and how indifferent we should be about the matter of fare—ten or twenty cents more or less. But the thing seemed so preposterous, so much like an air-castle, that we did not allow our thoughts to dwell upon it for fear of becoming a visionary. A palace-car on the Third Avenue line! We now put on a bold face and say, Why not? Inasmuch as street-car transit is a necessity, and becoming more so every day, there would seem to be no reason why all sorts of people should be packed indiscriminately in one class of cars, paying a uniform fare, and the lowest living rate at that. The street-cars being for the public use, and the companies owning them enjoying the franchise in perpetuity of occupying our streets, all classes of passengers should be accommodated. If there is a demand for a more luxurious car, why not allow the companies to supply it? There are thousands who would cheerfully pay double or treble the present fares for clean and comfortable seats in a better style of vehicle, and without being crowded. We trust our Albany friend will put his bill through. The project will not hurt us, if it don't do us any good. Try it on one line, and if it works well, it will be adopted by other lines, and then we can exercise the inestimable privilege of paying our money and taking our choice.

Paper Wheels.

THE Pullman Car Company is running a car on the Chicago and North-western road with what are called "paper wheels." The wheels have steel tires and cast-iron hubs, and the paper is introduced in the way of filling under the tires, for the purpose of deadening sound and diminishing the force of concussion. The wheels have been running since July last under this particular car, and had been in use some four months previously. The paper device is said to be superior to wood for the purpose designed, being stronger and lighter, and free from knots, grain, or sap. It does not expand or contract, but remains in the condition in which it is put in the wheels without liability of change. It is cheaper than wood, and can be moulded into any form by pressure, and is made fire and water-proof by asbestos. It is, as a substitute for wood, adapted to a variety of uses, especially in the way of ornamentation.

WE call attention to *Glynn's Anti-Incrustator* for steam-boilers, supplied by C. D. Fredrick, 587 Broadway. It is said to be superior to any other preparation used for the purpose, being free from acids, and destroying the incrustation without the least injury to the iron or other metal. See advertisement on fourth page of cover.

THE rolling-mills at San Francisco, which have been in operation two and a half years, use 400 tons of iron monthly, turning out 230 tons of finished iron, of which ninety tons consist of rails. Besides railroad iron, they have been turning out car-axles, spikes, shoe-shapes, and general railroad work.

Historical Sketch of Railway Cars.

IN continuing our remarks upon the railroad cars of this country, we feel it obligatory upon us to say that, in referring to some and passing others by without notice, those which we shall allude to will be mentioned only because of their novelty, and because they come within the scope of the plan adopted at the commencement of these articles; while those which we shall omit to mention will not be mentioned because of the want of time, or rather for the want of room within the limits prescribed.

Some of the novelties which made their appearance soon after the date mentioned in our last article may be enumerated as follows:

In 1852, Mr. W. L. Boss patented a reclining seat for passenger-cars, which is believed to have been one of the first, if not the first device designed to give relief to passengers in railroad-cars, by providing the means for a radical change in the position of such passenger. This seat consisted of three parts: the seat proper, which was stationary; a reclining back, which was provided with a pillow or cushion to rest the head upon; and a movable portion below the seat, which, when the back was in its inclined position, was thrown forward so as to form a support for the legs and feet of the passenger. Up to this time, very little attention seems to have been bestowed upon this subject, railroad companies having been satisfied with providing what they no doubt thought comfortable stationary seats for the passengers; but as soon as their attention was directed to the necessity of providing some additional comforts, they, with commendable zeal, entered upon the subject, and the result has been that inventors of this class have been well patronized, and the traveling public largely benefited.

On the 21st of July, 1854, Mr. S. F. Holbreck obtained a patent for a means of protecting passengers while traveling upon railroads, which consisted of an aperture formed in the floor of the car large enough to admit of the passage of persons through it. This aperture was covered with an easily removable cover, which was so arranged that, in the event of the car being thrown upon its side, a ready means of egress from such car could be had through such aperture. This device, it will be seen, differs only in size from the one recently adopted for the benefit of tobacco-chewers and smokers.

We shall now go back in the order of dates, for the purpose of describing a novel device which made its appearance in January of 1841, at which time it was patented to Mr. G. S. Hacker, and consisted of a car body which was nearly cylindrical in form, it varying from such form only in that its diameter at its centre was slightly larger than at its ends. It consisted of a series of hoops or rings of metal placed at proper distances from each other, the number being sufficient to form a car-body of the required length when properly covered upon the exterior surface with wood, and upon the interior with such material as was required to fit them for the kind of service for which they were intended. Owing to the form of this car-body, no frame-work was needed, except such as was necessary to admit of its being properly mounted upon its trucks, and for this purpose a bolster was used, its upper surface being of proper form to receive the body, while its lower surface was arranged to rest upon the truck much in the manner now in vogue.

In 1854, Mr. B. J. La Mothe patented a car-body consisting of a series of thin bars of iron, some of which passed around the same, they being bent so as to give the required form, while others passed horizontally along the sides and ends, they being riveted or bolted to those passing around at the points where they crossed each other. These bodies were covered upon the exterior surface with wood, each strip of which was secured to the bars of iron by screws, or in any other convenient manner; while the interior of such as were to be used as passenger-cars was covered with leather or cloth, and stuffed or wadded with hair or other suitable material.

In October of 1856, Mr. Joseph S. Brown produced a car-body, the sides of which were so constructed that they could be moved outward and inward, and thus the distance between them changed at pleasure. The mechanism for this change in the position of the sides of the cars consisted of a series of racks placed upon the bottom thereof, each rack having a pinion which was arranged to mesh into it, such pinions being placed upon two shafts which were placed under the bottom of the car, so that by applying a crank or wrench to the outer ends thereof, the sides of the cars could be moved outward, and thus the width of the car increased at pleasure. To prevent leaving an open space at the ends of the car when the sides were moved outward, the sides were provided with projecting pieces at their ends which slid in recesses in the stationary portions of the ends, such projections being at right angles to the sides; which form of construction permitted the sides to be moved outward some distance without opening any portion of the ends to the atmosphere. What the object of this arrangement was does not appear, and it is difficult to see any permanent advantage that could arise from it.

In 1856, a sleeping-car was invented and patented by Mr. J. J. Woodruff, which, when the berths were arranged in position for occupation, had three tiers of such berths, the lower tier being composed in part of the seats of the car. This appears to have been a great advance upon what had preceded it, as it added so many comforts to a night journey upon railroads; and we regret that in these articles we can not go into a general history of this particular kind or class of cars, as our limits forbid, and we must content ourselves with the mention of the fact that from this time improvements have been going on, until now we have cars in which a night can be passed with comfort.

One of the improvements that followed that of Mr. Woodruff, was that of Mr. J. W. Sibbet, in 1858, which consisted of a car for both night and day use, the seats being so constructed as to be capable of being divided horizontally, and the upper portions arranged to be raised so as to form berths in the upper portion of the car, while the lower fixed portions of the seats formed supports for a lower tier of berths.

In 1860, Mr. J. S. Seely produced and patented a car, the body of which was made of corrugated sheet-iron exclusively, except that the sills and iron bars at the corners were of flanged iron, the object being to give additional strength and afford the means of attaching the sheets together at such points. This car appears to have been designed principally for the transportation of passengers, but there can be no doubt that its originator believed it to be capable of being used for the transportation of merchandise. With the more recent improvements in passenger-cars all are familiar, and hence any attempt on our part to describe them would be a work of supererogation, and we shall not therefore attempt it.

In our next article, which will close the present series, we shall give some account of the improvements made in freight or merchandise and cattle-cars during the period covered by the present article.

SINCE the great robbery, the Central Pacific Company have arranged the couplings of the cars in such a manner that they can not be detached by any ordinary means without severing the heavy iron link or the pin. As an additional safeguard, they have substituted a copper wire-rope in the place of the usual style of rope to the signal-bell of the locomotive, which passes through the train overhead. This rope can not be readily cut, as on the occasion referred to, and any attempt to twist it off or break it would only ring the signal-bell for the train to stop.

TWO young men in Burlington, Iowa, have invented a machine that makes one hundred thousand match-splints per minute.

Car-Building in Michigan City.

THE car-works of Messrs. Haskell & Barker, so well and favorably known at the West, are located at Michigan City, at the southern extremity of Lake Michigan. This point has a peculiar advantage in being contiguous to the timber regions of Western Michigan and Northern Indiana, where the various kinds of lumber required in car construction are most accessible and abundant. With an experience of some eighteen years in the business, during which time they have turned out no less than fifteen hundred cars of various kinds, they have established a deservedly high reputation for good taste and substantial workmanship. Their establishment is organized in the most effective manner, each department being under the direction of experienced and skilled mechanics, who have been for years connected with it. In the application of machinery, and in all the details of construction, every progressive improvement has been made available to an extent which makes their work compare favorably with the best rolling stock on our roads. The capacity of their works enables them to turn out an average of four freight-cars per day, and three passenger-cars per month. The hands are kept steadily employed, making cars of a standard pattern when not engaged in filling regular orders. Although the works are some fifty-six miles from Chicago, they are no less in the focus of Western railway enterprise, possessing all the advantages of that city as regards locality, with none of its disadvantages, and having equal facilities for shipping both by lake and rail. We are informed that the firm is shortly to be transformed into a stock company, under the name and style of "The Haskell & Barker Car Company."

Car-Seats.

THE railroad travel of the world, at least of our part of it, needs a newer and better basis than has been furnished hitherto in the uncomfortable cars into which the great majority of passengers are thrust and cribbed. To most people, these car-seats are but one remove from the stocks or the pillory; and in the present form, no amount of cushioning appears to help them or their occupant. They are too straight-backed and too flat-seated to make comfort possible, while the foot-holding arrangements are unworthy of the least confidence as conducive to enjoyment. Next to the berths of an old-style canal-boat, we must rank the inevitable railroad-car seat as a miracle of misery. To be sure that these square boxes are cushioned at all should be, we suppose, cause of gratitude; but we can imagine a differently-shaped seat, which, even without upholstery, might prove to be "tired nature's sweet restorer." Taking the benches, scattered so invitingly through the Central Park, as a model, we see no reason why something of that sort, fitting the form of the occupant, might not be adapted to railroad travel. In most other respects, the railway officials have shown signs of progress as years rolled on; but there has been a woeful lack of enterprise manifested in the direction of seating passengers comfortably. Varnish and paint and gilding are well enough in their place, but a weary traveler would willingly trade them all off for a firm clutch upon that *ignis fatuus* of the railway—an easy, enjoyable seat.—*N. Y. Times.*

THE January number of *The Hub*, a monthly journal devoted to the interests of carriage-building, announces that on the 15th of March next it will be combined with the New-York *Coach-Maker's Magazine*, forming a monthly periodical of twenty-four pages, embracing all the leading features of both publications. Sustained as it will be by a strong editorial force, it can not be other than a valuable medium of information for the trade it represents.

HON. JOSIAH QUINCY has petitioned the Massachusetts Legislature to compel railways terminating in Boston to run cheap trains, for the accommodation of working-men and women.

Improvements in Sleeping-Cars.

THE St. Louis *Democrat* describes as follows certain improvements in sleeping-cars which have been invented and patented by Joseph S. Du Bois, the inventor, who is a conductor on the Pacific Railroad of Missouri, and Mr. Thomas Dorwin, of Leavenworth, Kansas, the General Southern Agent of the Ohio and Mississippi Railroad:

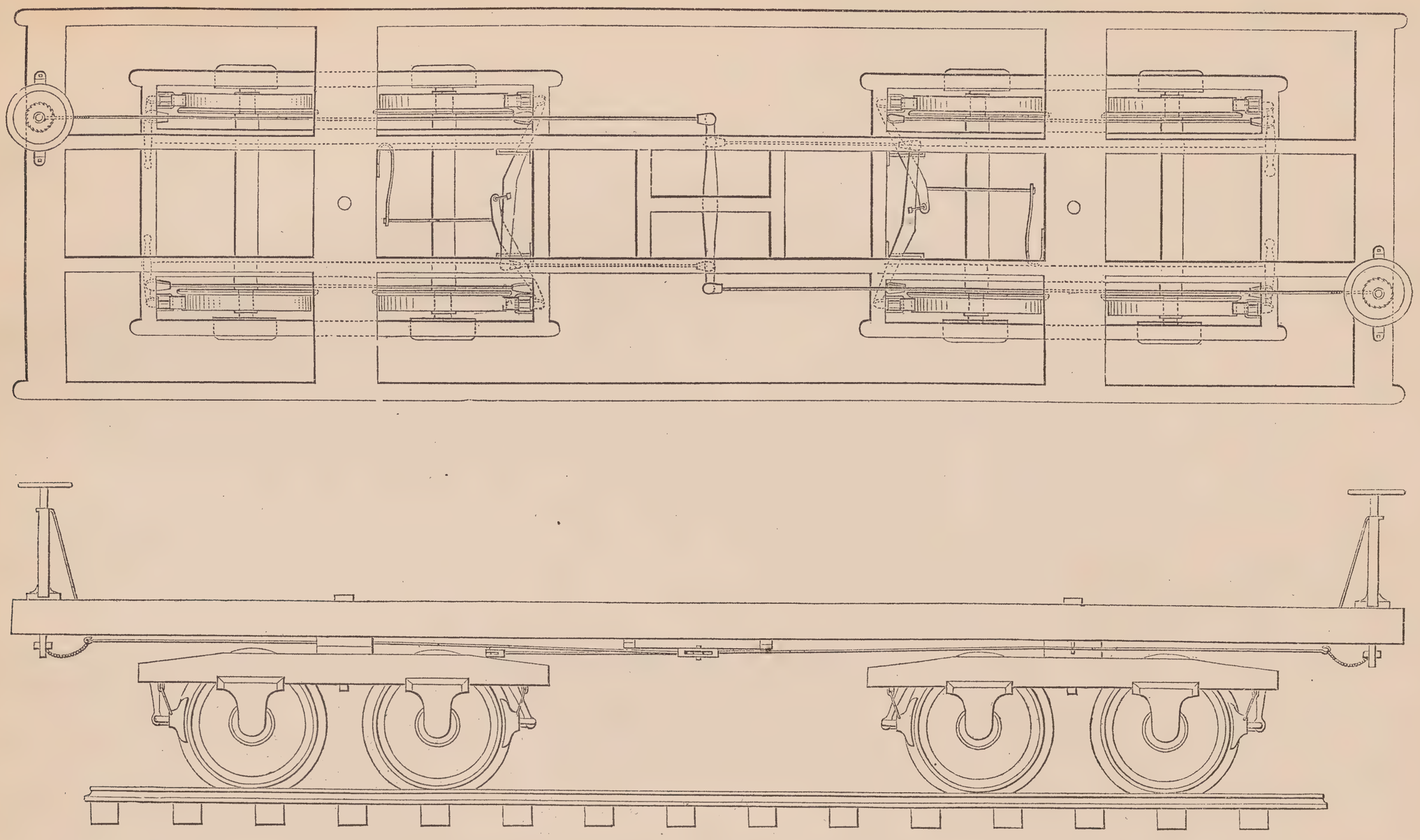
"According to the arrangement of the sleeping-cars now in use, the seats composing a section are made to face each other. This obliges, if the car is full, half of the passengers to ride backward, which is not only inconvenient, but decidedly unpleasant to many persons. Another objection lies in the fact that strangers are thrown together in the same compartment, and often ladies are subjected to considerable annoyance from this fact. Mr. Du Bois's invention is designed to do away with these difficulties. According to it the seats are so arranged that during the day all of them face in the direction of the car's motion, as is usual in ordinary passenger-cars. Being set on a pivot of a peculiar construction, they are capable of being turned around so as to face in any position required. At night they are placed in a manner similar to those of the common sleeping-car, and are then ready for the reception of the bedding. In addition to this improvement, there is also another, the advantage of which will be apparent at a glance. The rods which support the upper berths are made with joints, so that during the day they may be folded up and changed to a horizontal position parallel to the car's length. This gives a light and airy appearance to the car, and removes what is sometimes an inconvenient obstruction.

"The patent for the improvements is dated November 8th, and has just been received by the inventor. Cars, we understand, are soon to be constructed which will illustrate to the public the advantages thus secured."

Novel Road Engine.

A ROAD-ENGINE, recently invented by D. J. Lake, of Chicago, is thus described by the *Times* of that city: "In an ordinary locomotive, the steam power is communicated directly to the crank of the driving-wheels. In Mr. Lake's machine, when desirable, the motion can first be communicated to balance-wheels. When these wheels have reached a very high rate of speed, the power can be communicated by a 'clutch' to the driving-wheels. Suppose the vehicle in a place where it requires extra force to start it. By applying the power at once, no movement is effected; but by storing it up in the balance-wheels, and then communicating it to the drivers, one gets the same benefit that he would by getting a heavy wagon under rapid motion just before running it up an incline. The machine has two sets of driving-wheels, one considerably smaller than the other. By a screw, either set can be raised, leaving the other on the ground. In hauling heavy loads, the small wheels will be used; and in excursions, where there is no great weight to be hauled, rapidity is secured by the employment of the large drivers. A pump and air-chamber furnish a complete apparatus for throwing water; while a band-wheel allows the transfer of power to a thrashing-machine, or any other article of the kind. The engine weighs about three tons, moves without difficulty, and guides as easily as a well-trained horse."

A SHORT time ago, the engineer of a train on the Boston and Albany road, having run down a market-wagon, stopped the train as soon as possible to learn the result of the accident. Upon dismounting and looking on the platform connected with the cow-catcher, he found a respectable-looking man, well muffled up, with a bag of oats and a tub of butter by his side, sitting very composedly, apparently on his way to market. He was not hurt in the least, though his team was made into kindling-wood.



E. R. BROWN'S PATENT CAR-BRAKE.

A PERFECT car-brake is a mechanical problem which has attracted the attention of inventors since the beginning of our railway system. It is one of the indispensable adjuncts of a car, and upon its proper adjustment and effective working depend the safety of human life, and the comparative immunity from accident of our immense railway traffic. Various devices have been tried, with results more or less satisfactory; but it can hardly be said that the ultimatum of perfection has yet been reached.

The engravings illustrate a brake designed and patented by Mr. E. R. Brown, of Mauch Chunk, Pa., a perfect model of which may be seen at the office of Vose, Dinsmore & Co., No. 1 Barclay street. A careful examination of this model has given us a very favorable impression as to its merits. It is simple in construction, and has all the requisites of safety, economy, and small liability to get out of order. It dispenses entirely with that troublesome and costly appendage, the brake-beam, the failure or displacement of which is attended with so much peril. The brake-shoes, as shown in the engraving, are attached to the ends of wrought-iron levers, which are elevated so as to work entirely above the axles, and communicate with the brake-wheels by means of the usual connecting-rods, worked by a lever and centre-pin between the trucks. The whole brake can be worked by one wheel, or by the two in conjunction, producing a perfectly uniform pressure upon all the truck-wheels; and in case any, or all the shoes but one, should fail, there is still a brake—the one working independently of all the rest, and unimpaired by the failure of the others. The shoes are smaller and lighter than those used with the ordinary brake-beam, and in case one should become detached, it falls clear of the track and works no mischief to the running of the train. The shoe, however, is so connected with the lever, and also with the truck-frame, as to render it next to impossible for it to get out of place; nor are the levers liable to interfere with the flange of the wheel. The connecting-rods can be taken up by means of a thread and nut, so as to adjust themselves to the wearing of the shoes.

The engravings necessarily give a far less perfect idea of the details than the model. The practical utility of this brake has been abundantly tested, some twelve thousand of them being in use on the Lehigh Valley Railroad, besides many on other roads. Its first cost is no more than that of the ordinary brake, while the cost of repairs is a mere trifle, the rods, levers, etc., being wrought-iron, which does not wear out. Having seen numerous testimonials of its satisfactory working upon various roads, we do not hesitate to recommend it as worthy of the attention of railway managers throughout the country. Any further information in regard to it may be obtained by addressing Mr. E. R. Brown, Mauch Chunk, Pa.

The Broadway Underground Railway.

THIS structure commences at the corner of Warren street, and extends in a curve directly down Broadway. The lower terminus is intended to be at the South Ferry; but the present operating section only extends a little below the City Hall, a distance of some three hundred feet. We condense from the journal of the Franklin Institute the following description: The bed of the railway is 21 feet below the surface of Broadway, and the diameter of the tunnel 9 feet. The passenger-car is about the same size as the ordinary street-cars. It is very tastefully fitted up, brilliantly lighted, and has seats for twenty-two persons. It is propelled by means of a strong blast of air, which is supplied to the tunnel by a gigantic blowing-machine.

The whole operation is described as being exceedingly simple and effective. The visitor enters the waiting-room, an elegant apartment, but wholly underground, at the end of which is seen the mouth of the tunnel and the car. On reaching the lower end of the tunnel, the car moves instantly back to Warren street again, and so on. The air is so elastic that the changes of motion of the car are effected with exceeding gentleness, and are almost imperceptible to the visitor.

The car is run by telegraph; that is to say, the wheels of the car, at certain points on the route, press a telegraph-key, sending a signal to the engineer, who turns a valve, and thus reverses the air-current, without stoppage of the machinery.

The Æolor or blowing-machine by which the air-current is produced consists of a pair of great wings, geared together, and turned by steam. It is capable of discharging 100,000 cubic feet of air per minute. The south end of the tunnel is provided with a lateral air-shaft, which opens in the grass-plot of the City Hall Park. The air-current thus traverses through and through the tunnel, the atmosphere of which is thus kept pure and fresh.

During the construction of the tunnel, the entire travel of Broadway, omnibuses, carts, hacks, and other vehicles, in endless procession, passed on as usual, directly over the heads of the workmen. They were safely protected within the sides of an immense boring-machine, by which the bowels of the street were excavated. It is pushed forward into the earth by means of powerful hydraulic rams; and as fast as it advances, the masonry is built up within its rear. The general plan of the company is to lay a double line of tubes from the South Ferry, under Broadway, the entire length of the island, with a branch at Union Square, under Fourth avenue, to Harlem River. Such a road would have capacity for carrying forty thousand passengers per hour.—*Railway Times.*

An Iron Tie.

AN iron railroad tie has recently been invented, which, it is argued, is actually cheaper than the wooden cross-ties now in use. The wooden ties, it is stated, cost about seventy cents each, and must be replaced every three or four ties, while the iron tie, costing three dollars, when protected from corrosion by a coating of coal-tar, will never wear out. The most useful point of the invention is the method of affixing the rail. A half chair is cast on the tie, and the other half, composed of wrought-iron, is held in place by a wrought-iron key. The rail rests upon a rubber cushion four inches thick and five inches in length, which is protected by a tightly-fitting iron cap one eighth of an inch thick. It is claimed that the rubber cushions will keep the ends of the rails from being beaten down, and will, by preventing concussions, save the rolling stock and allow the trains to glide smoothly and rapidly along the track.

Correspondence.

BALTIMORE, January 20, 1871.

EDITOR OF THE NATIONAL CAR-BUILDER:

DEAR SIR: Noticing in your December number the letter of your Richmond correspondent, containing sundry items of interest to railway men, I take the liberty of sending you a few items from this locality, thinking they may not be unacceptable to your readers. The activity of railroad enterprise is manifest on all sides, and especially in construction and repair-shops, and the various details belonging to them. The paint-shop connected with the car department of the Baltimore and Ohio Railroad, at Mount Clare, can not be surpassed by any other shop of the kind in the country. It is built in the form of an L, one wing being 375 feet long by 95 wide, and the other 225 by 90, and both 65 feet in height, and capable of containing 35 first-class passenger-cars, with ample room for the workmen. The windows are large and afford plenty of light, and the entire building is heated by steam so regulated that a uniform temperature is secured. The lower floor is divided into various departments. One of these contains two vaults paved with brick, in which the oils, paints, and varnishes are kept; another is devoted to mixing paints, and another for varnishing and drying—one feature of this room consisting of a great number of little slides or drawers upon which the sash and blinds for car-windows are placed, securing in this way economy of space in connection with the drying process. Other rooms are used for upholstering; and there are also separate departments for new work and repair work respectively. I might amplify upon the many details and ingenious devices in this establishment, which combine to make it one of the most complete of its kind; but I fear your space would not permit. It is sufficient to say that every modern improvement is made available that can contribute to the construction of railway cars of the best style of workmanship and finish. The cost of this shop, including machinery and fixtures, was not less than $100,000. The company contemplate erecting another very soon. Within the past year, the company has turned out of their shops at Mount Clare, more than a hundred new and thoroughly repaired passenger-cars; and the freight-car department turns out an average of one car per day, exclusive of repairs. The blacksmith's shop is 568 feet long, 75 wide, and 60 high, and contains eight heating-furnaces, two bolt-machines, eight steam hammers, 600 to 3000 pounds, two spike-machines, sixty forges, a rolling-mill with one eight-inch train three rolls high, and one fourteen-inch train two rolls high. The company do all their own bridge-work, make their own forgings, axles, and the greater part of the iron for their road. They also have a foundry and boiler-shop, in which are made locomotive-boilers, car-wheels, castings, etc. They use the Cochran patent for chilling.

The car department is under the direction of Mr. T. S. Schyack; the paint-shop is superintended by Mr. Reeves, and the upholstering by Mr. L. White. Mr. W. H. Shipley has charge of the blacksmith shop; Mr. M. Corprew, of the boiler-shop; Mr. W. Cochran, of the foundry; and Mr. Samuel Husten, of the machinery. Mr. John W. Davis is master of machinery for the entire road, and has for some time past been engaged in superintending the construction of one of the largest rail-mills in the country, designed to be used for making and re-rolling the rails used by this road. The number of engines on the road is 728.

The Northern Central Company are preparing to erect new shops near Bolton station, where their machinery department is now located. The car-shops of this company are at York, Pa.; the former being in charge of Mr. C. M. Lewis, and the latter of Mr. G. W. Demarest.

The Western Maryland Railroad have their shops at Union Bridge, in accordance with an agreement with the city, which advanced funds to complete the road. They are to have a road of their own from Owen's Mills to Baltimore. It is being pushed rapidly toward completion. R. V. Dohoney is the master mechanic of the road, and Mr. J. S. Rigney is the new general superintendent—the right man in the right place.

Yours truly, M.

Pure Art and Ornament.

THE designer of a temple, and he who carves the simplest ornament, are to be respected, if they contribute to the cultivation of mind by a love of the beautiful. To do this, one must have high emotions of soul; this is requisite for the production of pure art. There is poetry in painting, music, and sculpture, and all should seek pleasure in the beautiful, which has its foundation in the inner spiritualism of the virtuous soul.

We must all respect the arts as exhibited in those provinces of human industry, the useful manufactures. They contribute to the comfort and the elevation of man. But there are arts in manufacture—which the refined soul dislikes—to be seen in those ornamental fooleries with which many people decorate their persons, their houses, and their grounds. On many mantel-pieces are to be seen deformed specimens of animated nature, embodied in costly china or displayed in glittering gold. Costly vases encumber rooms, apparently as receptacles of dust, and tables are covered with gaudy wares which have not even the merit of amusing. Fantastic upholstering, gaudy china, costly lace, and flaming colors make a prodigious show in some mansions; but pure art is not there; that does not consist in the expense nor labor bestowed upon certain articles; a true work of art is something in itself.

Does it show a true appreciation of art to have the human form divine represented on a spittoon, or the figure of a lovely woman engraved on a whisky-decanter? Do not degrade art by associating it with low and inferior characters. There are those who have a soul for the beautiful, and who can detect a vulgar taste covered with gold or robed in the lace of Brussels. The mind is not satisfied with what is simply useful, or artisans might go a-begging. In no line of manufactured goods is the hand of an artistic mechanic so essential as in house-furnishing goods; but many of these manufacturers have yet to learn the line of demarkation between beauty and gaudiness.—*The Cabinet-Maker.*

Discovery and Invention.

DISCOVERY is an advance in science; invention is an advance in art. By the first our knowledge is increased; by the second it is applied. The mathematician discovers the properties of geometrical figures, after which he may invent instruments by which some of these properties can be demonstrated to the eye. The astronomer discovers the motion of the heavenly bodies by means of the telescope which he has invented; and this invention has resulted from the discovery that rays of light were refracted or bent in a certain manner when they passed from one medium to another, from air to glass. What we discover has previously existed; what we invent is new. The blood flows nowise differently since Harvey discovered its circulation through the body, and the planet Uranus moves on in the same course since Sir William Herschel's laborious scrutiny of the heavens found out its path among the stars; but, on the other hand, when Watt invented the condensing chamber for steam-engines, he called into existence a host of machines that had never before been dreamed of; and when Elias Howe succeeded in producing a piece of mechanism that would sew, a legion of mechanics and inventors were set to work. Discovery, therefore, is principally applied to speculative objects; invention to the mechanical arts.

Miscellaneous Items.

THE *Chicago Railway Review*, as a medium of railway intelligence and information, is not surpassed by any other journal in the country. Its columns exhibit industry and enterprise in the various departments of current news, statistics, and discussion. Its recent elaborate and valuable article on the progress of railways in the United States during the past year, attract general attention for its comprehensiveness and accuracy.

GEORGE H. STEM & CO., of Stemton, Northampton County, Pa., have recently made extensive improvements at their works, consisting of additional buildings covering altogether about five acres. They have three full sets of machinery in the car department, employ one hundred and sixty men, and by working overtime, can turn out twelve six-ton coal-cars per day.

A PARTY of Pennsylvanians propose to construct a narrow gauge railroad from Allentown through Reading and Lebanon to Harrisburg, running along Swatara and Tulpehocken creeks. As there is already a railroad on this line which is not overworked, a failure in this instance might indicate a bad location as much as a deficiency in the gauge.

HENRY A. LITTLE, Master Mechanic of the Peoria, Pekin, and Jacksonville Railroad, has resigned, and will, it is reported, on the 1st inst., become connected with the Baldwin Locomotive-Works. R. F. Hurd, late foreman of the machine-shops, has been appointed Master Mechanic in his place.

MR. JAMES BALL has been appointed Master Mechanic of the new Logansport shops of the Columbus, Chicago, and Indiana Central Railway. He has been connected heretofore with the Baltimore and Ohio and the Central Ohio. There are about 80 locomotives under his care.

THE Philadelphia, Wilmington, and Baltimore Railroad Company have just completed four Pullman coaches, and have two more in progress. They intend building twenty first-class coaches for the Air-Line Railroad between New-York and Washington.

THE Lewis Iron Company, of St. Louis, has closed a contract with the Missouri, Kansas, and Texas Railroad for 500 freight-cars, said to be the largest contract of the kind ever made in the West, amounting to nearly $400,000.

WILLIAM SWANSTON, formerly master mechanic of the Cincinnati, Sandusky, and Cleveland Railroad, has been appointed Master Mechanic of the Burlington, Cedar Rapids, and Minnesota Railroad.

THE Jackson & Sharp Company Works at Wilmington, Del., are finishing up twelve first-class passenger-coaches for four different roads, and are also building four Pullman sleeping-coaches.

HARLAN, HOLLINGSWORTH & CO., at Wilmington, have a quantity of work on hand, which they are pushing to completion with their accustomed energy and promptness.

THE machine-shop of the Stonington Railroad Company, in Providence, destroyed by fire a few months since, has been rebuilt, and work has been begun in it.

IN Iowa, recently, a brakeman lost his hand in coupling cars, because he had a wet glove which froze to the link so that he could not withdraw his hand.

SAMUEL L. CAMPBELL has been appointed Purchasing Agent and Paymaster of the Marietta and Cincinnati Railroad, with headquarters at Cincinnati.

THE Pullman Car Company have at present three hundred cars running, and they also have eighty-five more in process of construction.

THE Vermont Central Railroad Company have made arrangements to rent Pullman cars on their road and its connections, extending some six hundred miles, so that passengers may travel through from Montreal to Boston, and so on to Chicago, by these conveyances.

THE car-works owned by the Pittsburg, Cincinnati, and St. Louis Railroad Company, at Logansport, Ill., occupy twenty-five acres, on which are nine buildings. Six hundred workmen are employed. Three cars per day can be turned out at these shops.

THE employees in the New-Haven Car Company's works at Newhallville, Ct., a few days ago presented to the superintendent of the works, Mr. J. T. Leighton, a handsome gold chain and locket worth $150.

THE oldest locomotive in the United States is now said to be at Carbondale, Pa. As many places claim this locomotive as claimed the birthplace of Homer.

DURING the year 1870, there were 15,605 miles of railway projected in the United States, and 5574 miles completed and opened to business.

FREDERICKS & Co., of Catasauqua, Lehigh County, Pa., employ about two hundred men, and turn out twelve coal-cars per day.

THE Mont Cenis Tunnel is completed. It is seven miles in length and four thousand feet above the level of the sea.

Facetiæ.

THE hat was passed around a certain congregation for the purpose of taking up a collection. After it had made the circuit of the church it was handed to the minister, who, by the way, had exchanged pulpits with the regular preacher, and he found not a penny in it. He inverted the hat over the pulpit cushion and shook it, that its emptiness might be known, then raising his eyes toward the ceiling he exclaimed with great fervor, "I thank God that I got back my hat from this congregation."

"YOU see, grandmamma, we perforated an aperture in the apex, and a corresponding aperture in the base; and by applying the egg to the lips and forcibly inhaling the breath, the shell is entirely discharged of its contents." "Bless my soul," cried the old lady, "what wonderful improvements they do make! Now, in my younger days, we just made a hole in each end and sucked."

A CLERGYMAN was lately depicting before a deeply interested audience, the alarming increase of intemperance, when he astonished his hearers by saying, "A young woman in my neighborhood died very suddenly last Sabbath, while I was preaching the Gospel in a state of intoxication."

A LITTLE boy who had imbibed more of the Young America spirit than politeness, was reproved last Fourth of July for picking his nose. "It's my nose," he replied, "and this is the day of American Independence, and I'll pick thunder out of it if I'm a mind to."

A GENTLEMAN was invited to take a glass of lager-beer the other day, which he declined, when his friend urged him to drink, assuring him that the beer was a good tonic and quite healthy. "Yes," said he, "it's Teutonic."

A DANDY, while being measured for a pair of boots, observed, "Make them cover the whole calf." "Heavens!" exclaimed the astonished artist, surveying his customer from head to foot, "I have not leather enough!"

"YOU need a little sun and air," said a physician to a maiden patient. "If I do," was the reply, "I'll have to wait till I get a husband."

"DOES the razor take hold well?" inquired a darkey, who was shaving a gentleman from the country. "Yes," replied the customer, with tears in his eyes, "it takes hold first-rate, but it don't let go worth a cent."

AN IRISH ADVERTISEMENT.—Lost, on Saturday last, but the loser does not know where, an empty sack, with a cheese in it. On the sack, the letters G. P. are marked, but so completely worn out as not to be legible.

"LOOK not on the wine when it is red!"
"I don't," said a wicked fellow;
"For I drink Jersey lightning now,
And that is a dirty yellow."

THE alderman who was lately injured by the accidental discharge of his duty, is reported to be in a fair way of recovery. He says that he'll never be caught that way again while in full possession of his senses.

AN Irishman being asked, on a late trial, for a certificate of his marriage, took his hat off and exhibited a huge scar, which looked as though it had been made with a fire-shovel. The evidence was satisfactory.

AN old darkey down South says, "Dey tell us dar war pervisions in de Constitution for colored folks, but dat was a lie—dem pervisions didn't come—I aint seen the first mouthful."

THE editor of a Chicago newspaper has declared, in speaking of the filth of that city, that he had two hundred and twenty several and distinct smells, with three wards to hear from.

"FANCY," said Sydney Smith, to somebody, when he was told that one of the giraffes of the Zoölogical Garden had caught a cold, "a giraffe with two yards of sore throat."

A MINISTER once prayed: "O Lord! we thank thee for the goodly number here to-night, and that thou art also here, notwithstanding the inclemency of the weather."

A CINCINNATI child tied crape on the door-knob to see if the carriages would come to take them out riding, as they did the family across the street.

A TRAVELING piano-player undertook to whip an Illinois editor, and when he got through, the piano-pounder had only one ear for music.

REV. DR. BENT, of Baltimore, reports that he went to church, where he "heard music that made him wonder how he got in without a ticket."

"TOM, tell the biggest lie you ever told, and I'll give you a glass of beer." "A lie! I never told a lie in my life." "Draw the beer, boy."

A GROCER complained to for selling bad eggs, said, "During the summer months hens are unwell and frequently lay bad eggs."

"YOU seem to walk more erect than usual, my friend?" "Yes; I have been straightened by circumstances."

A SMART lad, hearing his mother remark that she was fond of music, exclaimed, "Then why don't you get me a drum?"

Locomotive Builders.

Baldwin Locomotive Works	Philadelphia, Pa.
Brooks Locomotive Works	Dunkirk, N. Y.
Danforth & Cooke	Paterson, N. J.
Dickson Manufacturing Co	Wilkes-Barre, Pa.
Grant Locomotive Works	Paterson, N. J.
Hinckley & Williams	Boston, Mass.
Manchester Locomotive Works	Manchester, N. H.
Mason, William	Taunton, Mass.
McKay Iron and Locomotive Works	Jersey City, N. J.
Portland Company	Portland, Me.
Pittsburg Locomotive Works	Pittsburg, Pa.
Rogers Locomotive Works	Paterson, N. J.
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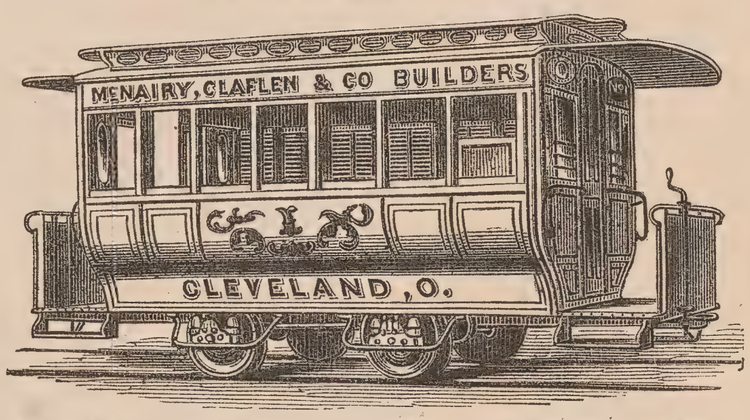

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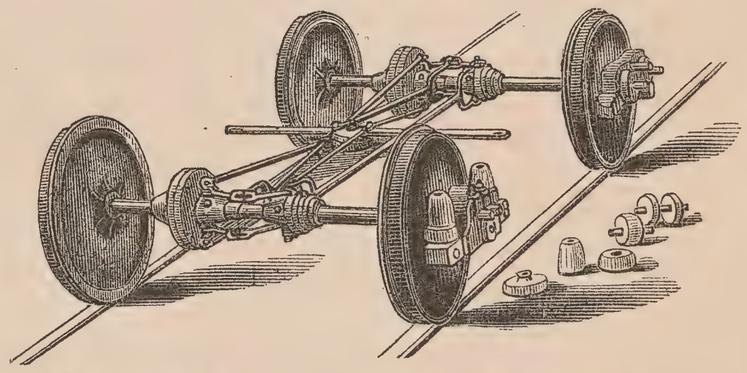

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B

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Buffalo & Washington			Buffalo, N. Y.
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Buffalo, Corry & Pittsburg	Thomas Connell.	Thomas Connell	Corry, Pa.
Buff. Bayou, Brazos, Colorado	E. Perry	M. Borst	Harrisburg, Tex.

C

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	Thomas Single		South-Amboy.
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Concord & Claremont	J. N. Lander	A. Langmaid	Concord, N. H.
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Contoocook River			Concord, N. H.
Conn. & Passumpsic Rivers	Horace Alden	Horace Alden	Lyndon, Vt.
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Central R. R. of Iowa	H. P. Vedder	H. P. Vedder	Elden, Iowa.
Central Pacific	A. J. Stevens	Benjamin Welch.	Sacramento, Cal.

D

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Dorchester & Delaware			Cambridge, Md.
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Dutchess & Columbia			Washington, N. Y.

E

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Eastern	John Thompson		East-Boston, Mass.
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East-Tennessee & Georgia	Eli Hixon		Knoxville, Tenn.
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Erie Railway	James B. Grigg		
Erie Railway	H. L. Brown	C. A. Smith	Jersey City, N. J.
Erie Railway	M. E. Brown	M. Wilder	Buffalo, N. Y.
Erie Railway	W. E. Cooper	W. E. Cooper	Hornellsville, N. Y.
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European & North Am. (of Maine)	A. O. Bailey	J. H. Brown	Oldtown, Maine.
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Eldora			Dubuque, Iowa.

F

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Fitchburg & Worcester			Fitchburg, Mass.

G

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H

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Huntington & Broad-Top Mountain	D. G Gilchrist	M. Tellerhoof	Saxton, Pa.
Hempfield	T. Marsh		Wheeling, Va.
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Hudson River	John Dykeman	Charles D. Mills	East-Albany, N. Y.

I

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Indianapolis, Peru & Chicago	John McKenna	John McKenna	Peru, Ind.
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Iron	Perry Scott.	Clem. Roetling	Ironton, Ohio.
Indianapolis & St Louis	C. E. Benton	C. E. Benton	Mattoon, Ill.

J

Jeffersonville, Madison & Indiana	Reuben Wells	John Higgins	Jeffersonville, Ind.
Jackson, Lansing & Saginaw	Andrew Wilson	A. Wilson.	Jackson, Michigan.

K

Keokuk & St. Paul	P. R. Sutton	Wm. McElroy	Keokuk, Iowa.
Knox & Lincoln			Bath, Maine.
Kentucky Central	J. R. Ledyard	J. L. Hackenthorn	Covington, Ky.
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Kansas City, St. Joseph & Council Bluff	H. L. Cooper		St. Joseph, Mo.

L

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Lehigh Valley	P. Hofecker.	E. R. Brown	Weatherly, Pa.
Lehigh Valley	A. Mitchell.	Mauch Chunk, Pa.	Delano, Pa.
Lehigh Valley	D. Clark		Hazelton, Pa.
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Lehigh & Susquehanna	Wm. H. Brown		Mauch Chunk, Pa.
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Lewy's Island	C. W. Button	Damase Merceir	Milltown, Maine.
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Lebanon Springs			Burlington, Vt.
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Louisville & Nashville	Thatcher Perkins	Isaac M. Owens	Louisville, Ky.
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Michigan Southern Division	James K. Taylor	John Kirby	Adrian, Mich.
Michigan Southern Division	B. H. Kidder.		La Porte, Ind.

M

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Macon & Western	B. Pope Freeman	James A. Knight	Macon, Ga.
Manchester & Lawrence	Edward Studley	M. W. Dickerman.	Concord, N. H.
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Maysville & Lexington			Maysville, Ky.
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Memphis & Charleston	Michael Burk	A. W. Drew	Memphis, Tenn.
Memphis & Charleston	L. M. Sellars.	Thomas Varun	Huntsville, Ala.
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Mississippi, Gains. & Tus			Gainsville, Ala.
Midland Pacific			Nebraska City, Neb.
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Milwaukee & St. Paul		John Baillie	Milwaukee, Wis.
Minnesota, Iowa & Dakota Division	James Waters	D. F. Wilson	Minneapolis Minn.
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Montgomery & Eufaula	James McCann	I. E. Holmes	Montgomery, Ala.
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N

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New-Bedford & Taunton	Robert Chase	Robert Chase	New-Bedford, Mass.
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New-York & New-Haven	H. Kittendorf	M. C. Andrews	New-Haven, Ct.
New-London Northern	J. W. Dow	George Boyden	New-London, Ct.
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New-Haven & Derby			New-Haven, Ct.
New-Orleans, Opelousas & Gt. Western	John McCluskey	Matthew Nolan	Algiers, La.
New-Lisbon			Leetonia, Ohio.
New-Orleans & Ohio	John R. Jordan	John R. Jordan	Paducah, Ky.
New-Orleans, Jackson & Gt. Northern	John Conlon	Charles Bartine	New-Orleans, La.
New-Haven, Hartford & Springfield			Hartford, Ct.
Naugatuck	R. Post	George W. Gray	Bridgeport, Ct.
Newark & Bloomfield	Luke F. Tronson		Hoboken, N. J.
Nova Scotia	W. Johnson		Bedford, N. S.
North-Missouri		C. S. Buck	St. Louis, Mo.
North-Carolina	E. Burns	B. G. Sergeant	Co. Shops, N. C.
New-Orleans, Mobile & Chattanooga	George Shattuck	George Shattuck	
Northern Central	C. M. Lewis		Baltimore, Md.
Northern Central		G. W. Demarest	York, Pa.
North-Lebanon		Henry B. Oves	Lebanon, Pa.
North-Pennsylvania	Franklin Roop	Franklin Roop	Philadelphia, Pa.
North-Eastern	D. W. Haines	A. M. Corrie	Florence, S. C.
Northern	James W. Lander	Albert Langmaid	Concord, N. H.
Northern of New-Jersey	T. W. Demarest		New-York.
Norwich & Worcester	Richard Colburn	G. R. Bentley	Norwich, Ct.
Northern of Canada	James W. Forster		Toronto, Can.
Norfolk & Petersburg	J. S. Whitworth	J. S. Whitworth	Norfolk, Va.

O

Ogdensburg & Lake Champlain	William A. Short		Malone, N. Y.
Oswego & Syracuse	Josiah Bettis	J. H. Parker	Oswego, N. Y.
Ohio & Mississippi	George W. Harris	M. M. Martin	Cochran Shops, Ind.
Old Colony & Newport	C. F. Bullock	A. Gleason	Boston, Mass.
Orange, Alexandria & Manassas	James E. Waddy	John T. Nalls	Alexandria, Va.
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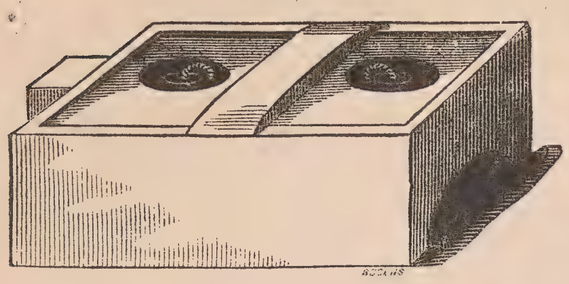

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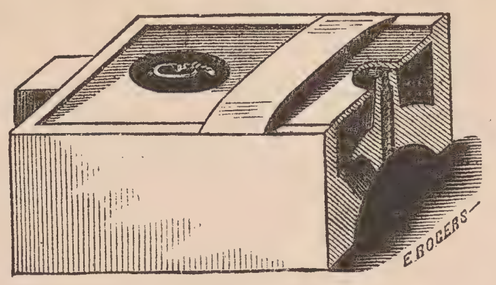

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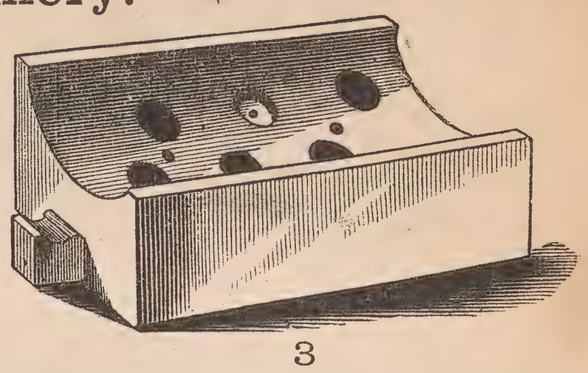

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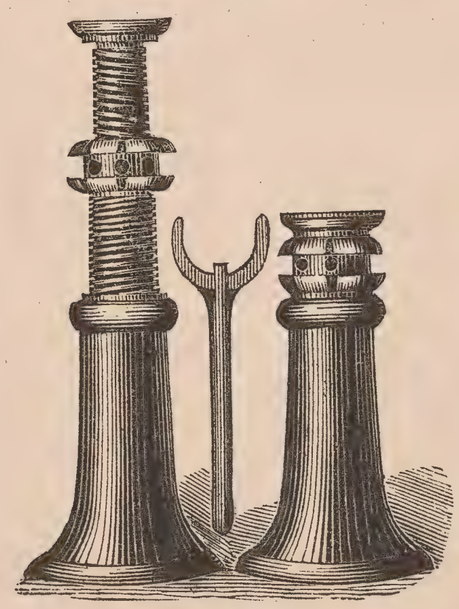

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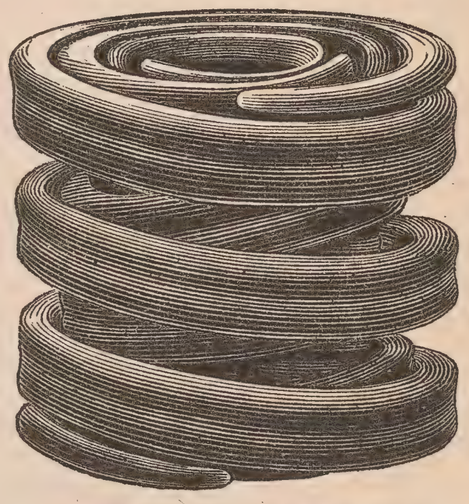

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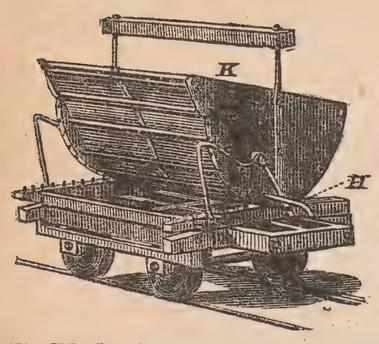

Fig. No. 1, Car Loaded and at Rest.

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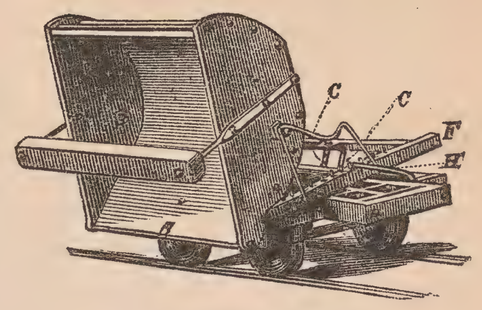

Fig. No. 2, Car Dumped.

TO DUMP THE CAR.

The brakeman seizes the lever, H, and raises it about a foot, thus releasing the hopper from the catch, C, and the tilting frame, F, from the catch, C, when the hopper, K, yields to the force of gravity and rolls over to the position shown in Fig. 2.

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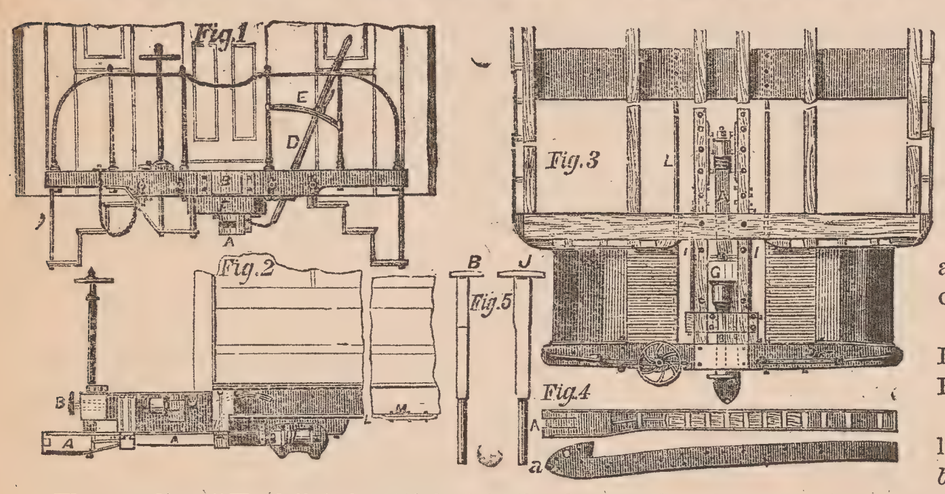

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DESCRIPTION.

Figure 1 is an elevation; Figure 2, a longitudinal section; Figure 3, a plan of an end of a car to which the arrangement has been applied; and Figures 4 and 5 show top and side views of the "Hook" and "Buffer," drawn on a larger scale than that of Figures 1, 2, and 3.

The letters refer to the same parts in all the figures. A is the coupling "Hook," B the "Buffer," C the "Stop," D the "Lever," E the "Quadrant Ratchet," F the "Truss Beam," G the "Spring Beam," H the "Suspender Beam," I the "Upward Trusses," K the "Main Spring," L the "Downward Trusses," and M the "Bolster."

The Platforms, instead of being located below the centre line of the main sills of the cars, are placed *in* that line, and held there by the Trusses I and L, so that the point of contact (in Buffers B) is *in* the said centre line and *not below* it.

The coupling "Hook" A is attached to the draw spring the same as the ordinary draw head, and at the same height above the track, but in such a manner that the outer end is free to move laterally for a short distance. The Coupling Hook projects beyond the platform. The Stop C is placed under the Buffer Beam to prevent accidental uncoupling. When two cars are brought together, the Coupling Hooks, from *their shape*, push each other aside, until the Buffers B are compressed hard on the Buffer Springs, then—*the points of the hooks having passed each other sufficiently far*—the Hooks are carried forward by their main-springs, and thus the "*Coupling*" and "*Compression*" are both effected automatically *and at the same time*, and without the use of links and pins. When two cars are thus coupled together, the *head* of the *Hook* of each car is under the Buffer Beam of its opposite car, and the platforms are close together, (about 4 inches apart.) The effect of this is, *one platform can not be forced over the other*, nor can a *child* fall between the platforms; the dust and rain are nearly all shut out; the "Compression" makes the train run steadily, and prevents all jerking at starting and stopping.

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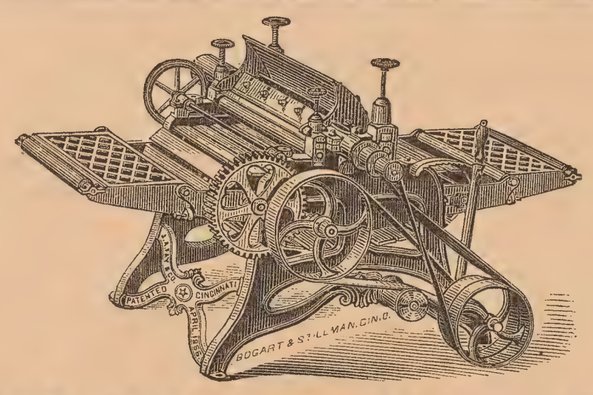

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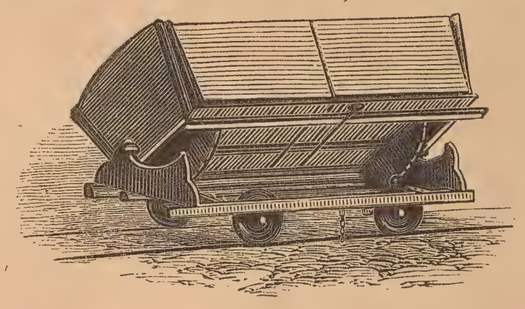

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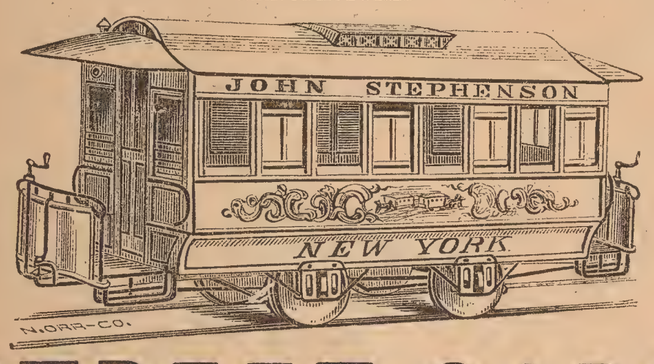

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THE NATIONAL CAR BUILDER.

DEVOTED TO THE INTERESTS OF RAILWAY ROLLING STOCK.

Vol. 1. No. 9. | MARCH, 1871. | *50 Cents per Annum. Single Copies, 10 Cents*

Warming and Ventilation of Railroad Cars.

THAT a constant supply of fresh air is absolutely essential for the preservation of health, all who have given the subject very careful consideration are now agreed. Unfortunately, however, very few people have ever given enough attention to it to be able to realize its importance. Air being invisible and only to a limited extent perceptible by the sense of touch, and, when pure, odorless, it has somewhat of an impalpable nature, so that its properties are not readily apprehended. It is inhaled without any conscious effort, and performs its function of sustaining health and life in a hidden and seemingly mysterious way. It may be breathed when it is deteriorated to a degree highly injurious to health, and we be insensible to the fact. The worst effects produced by impure air are seldom noticed at the time, and can only be recognized by careful and intelligent observation and deduction. It is perhaps not surprising, therefore, that the importance of breathing pure air is not better understood by the mass of mankind. Multitudes of people do not seem to have any perception of the difference between air which is pure and that which has been contaminated by the breath of others. They can not *see* the foulness, and therefore do not believe that it exists. A very limited experience in railroad travel will show that of a carful of passengers the great majority will not only consent to ride for hours without opening the ventilators, but in the cold weather many will *object* to having them opened. Dr. Franklin wrote in one of his letters, "for some are as much afraid of fresh air as persons in the hydrophobia are of fresh water." This is as true at the present day as it was when it was written. Mr. Beecher, in a lecture delivered to medical students in Brooklyn, referred to this subject, and said, "The principal use which men seem to put air to is to destroy it. They go into their houses and shut out the exterior air, and burn by stoves that which is inside, and poison it by breathing, and then, when it is thoroughly destructive, go on breathing it and sucking it in as if it were a confection, or a luxury! Is there any body that teaches men what air means when applied to travel in steamboats? It is enough to set one retching just to remember the cabin! Is there any body to teach the community the benefit of air in railway cars, in churches, in lecture-halls, in places of crowded assembly? We should scorn with ineffable scorn to sit down at a plate where a man had just eaten his meal, and take the knife that had just been in his mouth and put it in ours; but we will sit down and breathe the air that he has breathed, and that his wife has breathed, and that his children have breathed, and that the servants have breathed, and that forty others have breathed, and will think it just as good for our breathing, and will breathe it over and over again, as if it were a precious morsel. There seems to be no power to impress men that God made pure air for promoting health, and that impure air produces sickness."

This lamentable ignorance and indifference will be found everywhere, and unfortunately is not confined to the ignorant classes alone. Very few of the persons who have charge of the cars on our railroads seem to have any clear ideas of the necessity of ventilation, or of the quantity of fresh air required by each passenger, or of the laws which must be observed in order to supply it. To a certain extent this can be accounted for, it is true, by the uncertainty and indefiniteness which still exist among those who have given most thought and study to the subject. Any one who makes careful investigation of its principles will be astonished to find what a great diversity of opinion exists. The doctors on this, as on every thing else, disagree. Some of the books which have been written on the subject advocate special theories or "systems," most of them are superannuated and none exhaustive on the subject, considered in the light of existing science. Much discretion must, therefore, be exercised in adopting any conclusions, and great care be taken to sift the wheat from the chaff. Many very important questions relating to the subject are still in dispute, and considerable uncertainty exists in relation to others. There are, however, enough well-known and easily demonstrated laws which are not disputed, and which, if observed, will insure thorough ventilation.

All physiologists are agreed that oxygen is the element in the atmosphere which sustains life. Without it death ensues, and any reduction of the quantity existing in ordinary air renders the latter unwholesome and unfit to be breathed. Considerable difference of opinion still exists in regard to the effect of breathing carbonic acid. Some assert that it is a positive poison, while others say it is only injurious when combined with other gases, while Professor Huxley says, "It is possible that what appears to be the directly poisonous effects of carbonic acid may really arise from its taking up the room that ought to be occupied by oxygen." It is not important, however, for our present purpose to know whether people are injured by too much carbonic acid or too little oxygen. The injurious effect is all that need concern us now. There is no doubt that when air is once breathed, it is deprived of a portion of its oxygen, and its place is filled with very nearly the same quantity of carbonic acid. Professor Huxley's *Elementary Lessons on Physiology* contains the following account of the process of respiration:

"If an adult man breathing calmly in the sitting position be watched, the respiratory act will be observed to be repeated thirteen or fifteen times every minute. . . . At eacn inspiration about thirty cubic inches of air are inspired, and at each expiration the same, or a slightly smaller volume, (allowing for the increase of temperature of the air so expired,) is given out of the body.

"The expired air differs from the air inspired in the following particulars:

"1st. Whatever the temperature of the external air, that expired is nearly as hot as the blood, or has a temperature between 90° and 100°.

"2d. However dry the external air may be, that expired is quite or nearly saturated with watery vapor.

"3d. Though ordinary air contains nearly 2100 parts of oxygen, and 7900 of nitrogen, with not more than three parts of carbonic acid in 10,000 parts, expired air contains about 470 parts of carbonic acid, and only between 1500 and 1600 parts of oxygen, while the quantity of nitrogen suffers little or no change. Speaking roughly, air which has been breathed once *has gained five per cent of carbonic acid, and lost five per cent of oxygen.*

"The expired air contains in addition, a greater or less quantity of animal matter of a highly decomposable character.

"4th. Very close analysis of the expired air shows, firstly, that the quantity of oxygen which disappears is always slightly in excess of the quantity of carbonic acid supplied; and, secondly, that the nitrogen is variable — the expired nitrogen being sometimes slightly in excess of, sometimes slightly less, than that inspired, and sometimes remaining stationary.

"From three hundred and fifty to four hundred cubic feet of air are thus passed through the lungs of an adult man, taking little or no exercise, in the course of twenty-four hours, and are charged with carbonic acid and deprived of oxygen to the extent of nearly five per cent."

In another chapter of this book he says,

"It is estimated that, as a general rule, the quantity of water excreted by the skin is about double that given out by the lungs in the same time. The quantity of carbonic acid is not above one thirtieth or one fortieth of that excreted by the lungs."

There are also other ingredients of an injurious character exhaled by the lungs, the effects of some of which are not yet clearly understood; but microscopic science is making it daily more probable that the germs of diseases not usually considered contagious are communicated by the human breath. In a recent work by Dr. Beale, in which he describes the nature of disease germs, he says,

"Such minute particles are liable to be suspended in the air we breathe, or they may be disseminated through the water we drink, or hidden in the food we eat. . . . . That such particles as those represented are sufficiently light to be supported in the air and carried long distances by air-currents, is proved by the fact that the scales of the wings of insects and starch corpuscles, each of which weighs more than a hundred times as much, are supported by the slight currents of air in our ordinary rooms, deposited upon shelves, and even transported long distances."

In another chapter he says,

"In all cases in which disease germs produce their characteristic effects, they reach the blood. Until they have entered the fluid, there is no possibility of their exerting any deleterious effects upon the system. Having entered the blood, they grow and multiply, and, as we shall see, presently become obstructed in the smaller capillary vessels, which give to each parti-

cular contagious fever the characteristics peculiar to it and enable us to recognize and define it.

"Suspended in the air, they may pass toward or into the air-cells of the lungs at every inspiration, some of the slightest particles might reach the ultimate air-cell where an exceedingly delicate membrane, easily penetrated by living particles, alone separates them from the blood.

"If living disease germs fell on the soft mucous lining of the air passages, they would there find a material, if not adapted for their nutrition, at least favorable for preserving them in a living state. Through this they would gradually make their way into the capillary vessels or lymphatics, ramifying in the tissues beneath."

Consider now for a moment the exposure to these germs of disease and death to which travelers are subjected. They are inclosed in an apartment which is often almost hermetically sealed, containing only about 3000 cubic feet of air, with from forty to sixty other people of all conditions of life, who are all liable to, and a portion of whom probably are, affected by some of tne diseases to which humanity is prone. The air is breathed over and over again, first by one and then another. That which has passed through tuberculous lungs and is filled with their minute exhalations must pass through ours. Throat-diseases, catarrh, fevers, disordered stomachs, and perhaps, worse than all, personal uncleanliness, each contributes of its impurities. The exhalations from the skin and other portions of the body fill it to repletion with the miasm of disease and death. Remember, too, that the oxygen of the atmosphere is each moment being absorbed and replaced by carbonic acid, sulphureted hydrogen, and other matters, and, to quote again from Professor Huxley, "the persistent breathing of such air tends to lower all kinds of vital energy, and predisposes to disease." In addition to this, the great and sudden fluctuations in the temperature of the car, and the difference between that at the floor and the ceiling, which is often as much as 50°, and we have conditions than which it would be hard to devise any more favorable for the spread of disease. If, besides, we consider the risks of sleeping in such an atmosphere—of being subject to a violent perspiration one moment, in which the natural impulse is to throw off all the covering or a portion of the clothing, and then being exposed to a wintry freezing blast from an open door the next—and we have a combination of circumstances more productive of disease and death ten times over than accidents are, fearful as is their list of mortality and terrible as are their consequences.

It would not be easy to over-estimate the importance of the subject of ventilation. Nearly one half of the deaths in the city of New-York are attributed to bad air, and everywhere death reaps its harvest because people will not breathe fresh air, which we can have in unlimited quantities at any time, *excepting when we travel.* Surely it is time for people who build cars to give some intelligent and earnest thought to the question, and to devise some means to remedy the great evil.—*Chicago Railroad Gazette.*

Fast Trains.

THE *Official Railway Guide* has an article on fast trains between New-York and Chicago. It says, after citing examples taken at random from the time-tables, "that they indicate conclusively that if the net profits of these fast trains have not been so great as those of other trains, the failure may be traced to causes other than those of fast time; and the remedy lies, not in the alteration of time-schedules, but in the removal of certain evils which are being engrafted upon the railroad system of this country. First and foremost of these is the unhealthy and absurd competition for traffic by rival lines, which engenders a constant fluctuation of rates for travel, and seriously affects the proprietary interests. Managers should calculate accurately the expenses incident to running their trains, and the minimum profit requisite to repay them for the capital involved and the risk they run; they should also keep a faithful record of each train's earnings and expenses per mile run; and, with these data, rates sufficiently remunerative can be made by the short line to all common points, and should prove acceptable to competing routes having a longer mileage but geographical advantages which fully compensate for such increased distance. Rates should be classified according to the speed of trains and operating results. If there is any truth in the old adage, 'Time is money,' a higher rate should be paid by a passenger traveling between Chicago and New-York in twenty-seven hours, than by one traversing the same distance in thirty-six hours; and we believe that few would fail to recognize, as in England, the justice and expediency of such extra charge. Equitable and uniform rates can not, however, be maintained, unless arrangements are made in good faith, and unless executive officers will discard that petty jealousy which induces them to believe that their rivals are attempting to overreach them. Much might be said on this point; but we must investigate another cause which tends, in an equal measure, with low rates and excessive competition, to make through passenger business unremunerative. We allude to the dead-weight of rolling-stock, amounting, in some instances, to more than two tons per passenger carried. It is not increased speed, so much as increased weight of trains, which causes track and superstructure to depreciate rapidly, and which augments, in a much greater ratio than heretofore, ordinary expenses for repairs and renewal. Managers deprecate in the strongest manner this rapidly-growing evil, but seem powerless in their efforts to avert it; and the committee of master mechanics to whom this subject was referred failed, in their convention at Philadelphia, to report any plan which should relieve their machinery and the track from the severe and unexampled strain to which they are now subjected. It is believed that these palatial cars advertise a route, and that no through line can command its fair proportion of through passenger-traffic without being able to provide sleeping and drawing-room cars of the most ornate and *recherché* description; but statistics, if accurately prepared, would prove it to be a most expensive method of advertising; and, if the present system be continued, passengers should be definitely restricted to a certain space in these cars, and the actual dead-weight per occupant reduced to the minimum consistent with actual comfort and convenience. A question here arises, whether the cars for through-passengers might not consistently be reduced in size, especially when the business is merely in its infancy, and remunerative results are somewhat problematical. Occasionally three or four palace-cars, destined for as many different points, are hauled in one train, and the aggregate of passengers in each would not have completely filled one car; but as the false opinion is entertained that diminutive cars would seriously affect the reputation of any road using them, as their introduction would be at variance with the requirements of an established custom, the folly is perpetuated of maintaining appearances at an actual loss, and operating expenses are considerably in excess of what they would be if outlays were governed by actual results. Railroad management is a science; and it will eventually be demonstrated that it is not the largest passenger equipment which should be run, but that which will afford the best net profit on the passengers carried. On scientific principles alone, three cars forty feet long in a train are much safer and more economical than two cars sixty feet long, and, if the latter are constructed on the theory that strength and consequent weight must be in a corresponding ratio with the square of their length, the actual dead-weight in proportion to the passengers carried must necessarily be much greater in these than in the former. Enough has perhaps been said to show that, in estimating the policy of fast trains, we must look below the surface for the causes which have a tendency, if not checked, to make them unremunerative, and that the high rate of speed is not entirely blamable for the increased ratio of operating expenses with which our contemporary charges it. We live in a fast age; we think fast; we act with energy and rapidity; and, as fast time is entirely consonant with the feelings of this generation, we think that railroad managers have been *fortunate* in demonstrating that, with machinery and equipment superior to those of any other country, they also have a road-bed, superstructure, and track on which the running time of English railroads can be rivaled, and this too with perfect safety both to life and property."

Elevation of the Outer Rail, and Coning of Car-Wheels.

OWING to the centrifugal force generated in a train of cars moving around a curve, it is customary to elevate the outer rail to such an extent that the tendency of the cars to press against the inner rail by the force of gravity shall exactly equal their tendency to press against the outer rail by the centrifugal force. The centrifugal force increases as the square of the velocity; hence a given elevation of the rail can be exactly right for only one certain velocity. For example, suppose an elevation of two inches on a given curve is exactly right for a speed of twenty miles per hour, it should be four times two inches, or eight inches, for a speed of forty miles per hour, and two and one quarter times two inches, or four and a half inches, for a speed of thirty miles per hour. In the case of a speed of forty miles per hour, the speed is double what it was at twenty miles per hour, and the centrifugal force (2×2) four times as great; and in the case of thirty miles per hour, the speed is one and a half times that of twenty miles per hour, and the centrifugal force ($1\frac{1}{2} \times 1\frac{1}{2}$) two and one quarter times as great; hence the above stated elevations of the outer rail. It is impossible to so adjust this elevation as to be exactly right for both freight and passenger trains, and it is the custom to elevate the outer rail for a speed about midway between that of the fast express trains and the freight trains, so that the fast trains will press on the outer rail the most, and the slow trains on the inner rail the most. Every one knows that the outer rail of a railroad track is longer than the inner one, and the coning of the car-wheel, or the gradual increase of its diameter of tread toward the flange, is intended to facilitate the motion of the cars around a curve. Thus, a fast express train will press more against the outer rail than the inner, and by reason of the increased diameter of the tread near the flange of the outer car-wheel, the outer wheel will move further per revolution than the inner one. This would seem to be an indisputable argument in favor of the coning of car-wheels, and it has been so universally the practice on railroads that it seems hardly credible that there should be any thing incorrect about it. There are, however, very weighty arguments against the practice. In the case of freight-cars, the coning would act injuriously rather than beneficially, because it is against the inner rail that these cars have a tendency to press. But supposing the question is confined to the expediency of coning the car-wheels for fast passenger trains only, we find that the coning acts injuriously on the straight portions of the road, the wheels running up against one rail on to the largest diameter of the tread, and then against the opposite rail on to the largest diameter of the tread of the opposite wheel, and so on, first against one rail and then the other, producing an oscillation which is both disagreeable to the passengers and expensive to the stockholders of the road. Again, of how much value is the coning on curves? It is extremely small. On a railroad like the Hudson River or New-York Central, the radius of the curves is very large, one mile being very common—in fact, curves of a less radius than this are more seldom met with than curves of a larger radius. The diameter is of course, twice the radius, and the circumference, or length of a complete circle, three and one seventh times the diameter; thus a curve with a one-mile

radius would be (1×2×3 1-7=6 2-7) six and two sevenths miles in length. Now, the difference between the circumferences measured on the inner and outer rail is always equal to the circle having as radius the distance between the two rails. Thus, in the case of a broad-gauge road, whose gauge is six feet, the difference between the length of the outer and inner rails is only a trifle over eighteen feet in a complete circle, no matter what the diameter of that circle. In the case of a curve whose radius is one mile, the length is something over six miles, as stated above, and a car-wheel in passing over this six miles of curve would have to slip about eighteen feet if it had no coning. A curve on a road is never complete, however. One sixth of a circle, with radius of one mile, would be an ordinary curve, and its length would be one mile, and the difference in the length of the rails about three feet. Hence, the question arises, is it not better to use wheels with a flat tread, causing a very little slip on curves, and very little oscillation on the straight portions of the track, rather than coned wheels, whose efficiency is somewhat doubtful on curves, and which cause injurious oscillation on straight portions of the track. This question must be decided one way or the other, according to the circumstances. For instance, on some roads the straight portions of the track are the exception, and curved portions the rule; hence, coned wheels might be considered necessary. On other roads there might be a very few extremely sharp curves, and coned wheels might be necessary here. On city railroads, the gauge is the same as that of an ordinary railroad, and it is necessary to raise the cars on to the flange of the outer wheel in this case; but it must be remembered that the diameter of their curves is less than a hundred feet, whereas that of the curves on a steam road is a mile or two, and the difference between the lengths of the outer and inner rail is the same in both cases—about fourteen feet in a full circle. In conclusion, it is extremely doubtful if the present system of coning is beneficial, and cars with wheels having a flat tread have been tried and reported favorably on by the superintendent of one of our Western railroads.—*Manufacturer and Builder.*

Railways in the United States.

THERE are now in the United States 50,000 miles of railroad. The cost of these works exceeds $2,000,000,000. Their annual earnings exceed $400,000,000, and equal $11 per head of our entire population. They transport, annually, 125,000,000 tons of freight, or over three tons to each person, assuming our entire population to be 40,000,000. The value of their tonnage, at the low estimate of $100 to the ton, equals $300 per head, and an aggregate sum of $12,500,000,000—a sum six times greater than their cost. Every mile of road constructed adds five times its cost to the aggregate value of the property of the country.

All this vast commerce and wealth are wholly creations of railroads, and within the short space of twenty years. Such results are possible only in a country like our own, the market for whose staples, whether for home consumption or exportation, is within a narrow belt lying immediately upon its north-eastern coast-line, and more than 1000 miles from the great seat of production. Wheat, the most valuable of our cereals, will not bear transportation over ordinary earth-roads more than 350 miles; over railroads it will bear transportation 3500 miles. These works, consequently, are the only ones that have given, or that can give, a commercial value to the products of the interior. They increase the value of these products just in ratio as the cost of transportation is reduced. But for them many of the most densely inhabited, wealthy, and prosperous portions of the country would have remained as wild and uncultivated as they were one hundred years ago. But for them, our commerce, considered in reference to its vast magnitude, would hardly have had an existence. They lie at the foundation of and sustain all the varied interests of the country.—*Exchange.*

Fig. 1.

Gibson's Patent Car-Heater. Outside Appearance.

Gibson's Patent Car-Heater.

THE warming of street-cars has hitherto been regarded as something almost impracticable, owing to their small size, and the consequent inconvenience arising from the use of the common railway stove. The urgent need of some device whereby the occupants of these vehicles may be made comfortable during the severity of winter is apparent to every one, and may well claim the attention of inventors.

We give herewith illustrations of Gibson's patent car-heater, which has been used with success on some city railroads, and is spoken of in favorable terms by parties who have given it a trial. Fig. 1 is a view of a street-car supplied with one of the heaters. Fig. 2 shows a vertical section of a car with the heater and its adjuncts. A simple coal-stove, 1, which is constructed for the purpose, is bolted fast to the floor of the car, under the seat, and near the centre. From this stove a three-inch smoke-pipe, 2, passes along under the seat to one end of the car, and then up in one corner through the roof. The grate is on a line with the floor. The ash-pan, 3, is under the car, and is arranged with an air-slide, and held in place, when adjusted, by a pinch-screw. The stove is fed through the top, by lifting a double lid, 5, in the seat of the car, over the stove.

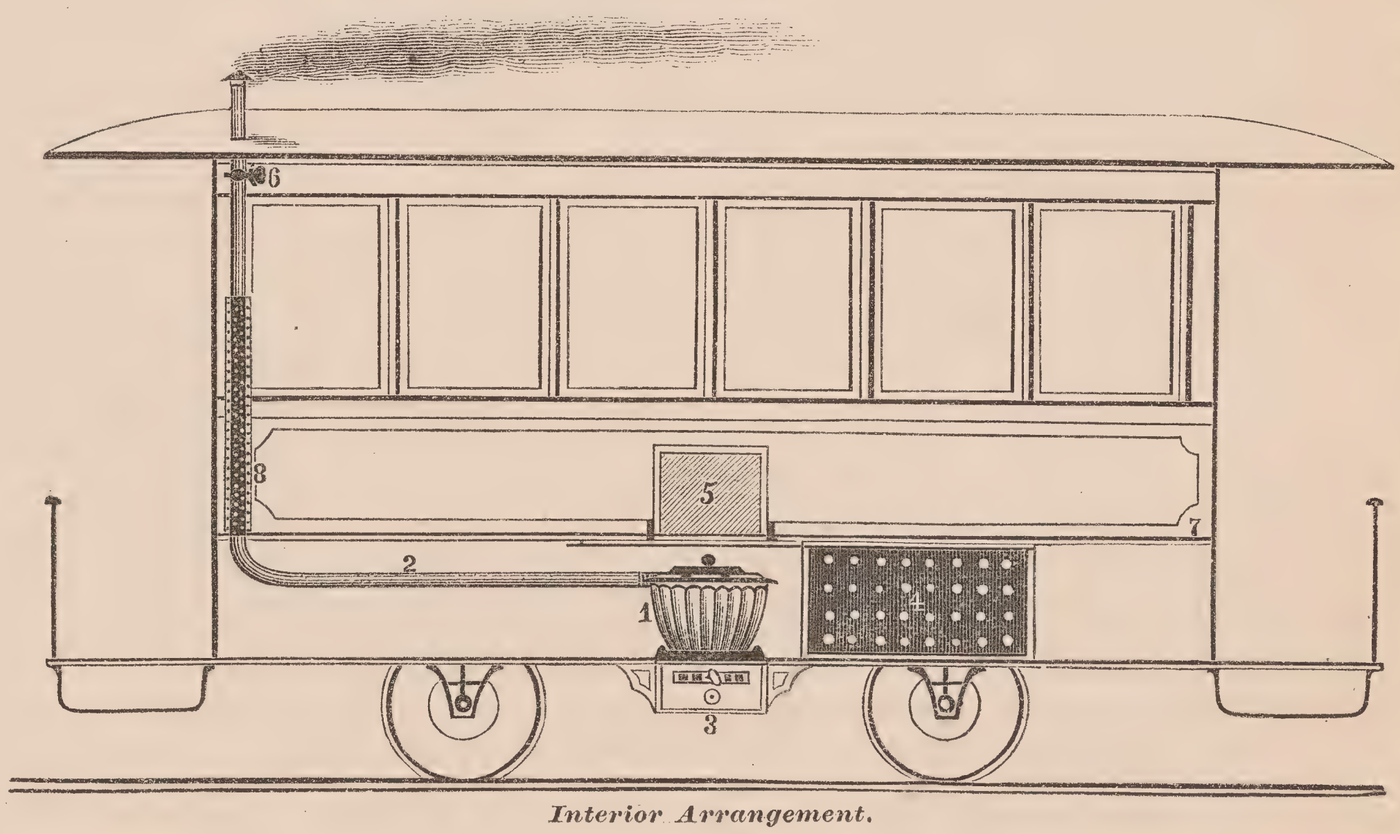
Passengers seated directly over the stove are protected from excessive heat by a double metal sliding-plate, 4, extending in front of and over the stove. The smoke-pipe is provided with a check-damper, 6, near the roof, which is also held in place by a check-screw. A protection, 8, surrounds the smoke-pipe above the seat, 7, so that passengers may lean against the pipe with safety.

by the passengers. This method of warming cars can be applied also to switch and flag-man houses at a great saving in the cost of fuel.

The inventor has also patented a device for warming steam passenger-cars, which consists in converting the space between the floor and the under-sheathing into warm-air chambers, the floor of the car, or such portions of it as are under the seats, being made of thin metal plates, through which a steady and uniform heat is radiated. The heater is located in a sub-room under the car, access to which can be had through a door in the floor, so that the heater can be fed and regulated while the train is in motion. Coal can be introduced into the sub-room through a sliding-door, thus avoiding the necessity of having coal-boxes in the body of the car, as is frequently the case. For large cars, two heaters can be used. This method of radiating the heat through the car-floor keeps the feet of the passengers warm—a very essential thing in traveling—and is less conducive to headache than the ordinary wood or coal-stoves. The inventor claims that his method is less expensive in construction, and requires less care, than the mode of heating by hot-water pipes running all round the ear, and which has been recently adopted by some of our railways. For further information, address the patentee, John Gibson, Jr., Albany, N. Y.

MR. S. T. EMERSON, who was last month appointed Chief Engineer of the North Missouri Railroad, has been kindly remembered by his old friends, the employees of the Illinois Central Railroad, who have presented him with a beautiful gold watch and chain

Fig. 2.



Interior Arrangement.

By the ash-pan of the stove being placed under the car, all dust from ashes and all danger from fire are avoided.

In this arrangement, none of the heating apparatus is visible in the car, except the small smoke-pipe in the corner, and no room is taken that is usually occupied

costing $325. Mrs. Emerson also received a silver tea set, of 25 pieces, costing $200.

JOHN T. WILSON, formerly of Aurora, Ill., and Ass't Master Mechanic on the Union Pacific, has accepted a similar position on the Central Pacific at Carlin, Nev.

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Editorial Announcements.

Correspondence.—*We cordially invite the coöperation of the railroad public in affording us the material for a good mechanical paper. Articles relating to rolling stock and machinery, by those practically acquainted with those subjects, will be gratefully received. All communications must be addressed to Vose, Dinsmore & Co., No.* 1 *Barclay Street.*

The name and address of the writer must accompany all communications designed for publication.

Advertising Rates.—*For one square, or one fifth of a column,* $5 *per month, or* $50 *a year. For half a square,* $3 *per month, or* $25 *a year. Larger advertisements by special contract.*

All communications in regard to advertising should be addressed to L. F. Dinsmore, *Post-Office Box* 4055, *New-York City, who is our agent for advertising, and authorized to make contracts, collections, etc.*

Engravings and Illustrations.

We would invite the attention of Master Car-Builders and others to the advantages to be derived from publishing in The National Car-Builder *engravings designed to illustrate the various features and details of car construction, and especially such improvements as can not otherwise be clearly presented. We will procure cuts to be made in the best manner from drawings or models that may be sent us, and charge only for the cost of engraving, inserting the same in our paper with suitable descriptive details, without charge. The cuts thus made by us, or that may be sent us for use in* The National Car-Builder, *will of course be returned promptly to the owner.*

Correction.

Our last issue contained a notice of the car-works of Messrs. Haskell & Barker at Michigan City, Indiana, in which it was stated that the works had turned out, within the eighteen years of their existence, no less than 1500 cars of various kinds. We scarcely need say that another cipher should be added to these figures, so as to make them read 15,000 instead of 1500.

We have been requested to publish, as one of the permanent features of The Car-Builder, a list of car-wheel manufacturers in the United States. In compliance with this request, we print in our present issue as complete a list as we can prepare at this time. We shall be glad to add to it the names of any others that may be brought to our notice.

Our January number contained, among its miscellaneous news items, a notice of the organization of the Hocking Valley Car Company at Columbus, Ohio. We now have authority for saying that the report is without any foundation, and that no such company has been formed.

A capable master-mechanic is wanted to superintend the building and repairing of cars and locomotives for a southern railroad. See advertisement on page 11.

There is a machine in operation in East Sumner, Maine, which can make thirteen thousand toothpicks in a minute.

The Hudson River Disaster.

Since the issue of our last number, another first-class railroad accident has been added to the lamentable catalogue of previous disasters. The particulars of the New-Hamburg catastrophe are known all over the land. The shock it occasioned has spent its force. The dead are buried, the wounded cared for, and the world moves on very much the same as before. Probably no occurrence of a like nature ever combined so many of the elements of the horrible; the crash of collision, unwarned and sudden as a thunderbolt, the outburst of flame, the submerging of a sleeping-car with its occupants in the icy waters, and the utter futility of any attempts at relief. That such a thing should happen upon one of our leading and most popular lines of road, is an evidence that railroad management has not yetreached perfection, or else that no amount of prudence and foresight can absolutely secure a car-load of passengers on any of our railroads from the contingency of sudden annihilation. Assuming that accidents involving loss of life will continue for some time to come to be a thing inseparable from the operation of railroads, we can only strive to diminish their frequency by avoiding the causes which produce them. In the present instance, the primary cause was the breaking of an axle on a freight train. This comparatively insignificant occurrence brought into activity a series of secondary causes, involving signals, brakes, combustible and explosive freight, and the general discipline of the road. A thorough investigation will enable the public to see what was defective, and justly apportion the blame. It seems to us, however, that the essential point to be borne in mind by railroad managers and car-builders is the importance of some absolute test of the soundness of axles, not only when they are new, but during every day they are in service. The axle of a freight-car should be as perfect as that of a drawing-room coach. Any thing short of this renders possible just such a calamity as the one we now deplore. Inferior or worn-out axles can not be used without making so many weak places, which are like the weak links of a chain—the chain being just as strong and no stronger than the weakest link in it. As regards signals and brakes, the inventive skill which is being directed to their improvement is an assurance that the present methods will sooner or later be superseded by something better. Some means should be devised for stopping a train, in an emergency, in much less time than it can now be done; and it would seem that the same enormous motive power which is employed to give such speed to passenger trains, ought to be made available in a corresponding degree to check their speed when required. The prevailing discipline of a road, and the intelligence of every grade of its employees, are important considerations in estimating the liability to accident. It is safe to say that such liability is lessened in nearly the same ratio that the discipline is strict and the employees intelligent and well paid.

Why Trains Jump the Track.

The New-Hamburg accident has called forth a great many suggestions and theories as to the cause of such accidents, and the means that should be employed to prevent them. We select the following, furnished by a correspondent of the New-York *Herald*, as being likely to interest car-builders:

"Any person conversant with our railroad system must see, if he will look, that the cause of the terrible accidents that occur from trains leaping the track or the breaking of rails is entirely owing to the faulty running gear in use, and is susceptible of remedy. American cars are supported on trucks, which are free to swivel or turn. These trucks have usually two pairs of wheels, each pair being secured to the same axle. These wheels have flanges, and are slightly beveled on the face, giving the wheel a larger diameter near the flange than at a distance from it. With this arrangement, when the wheels on the one side of any truck are rolling on their larger circumference, then those on the opposite side of the same truck are rolling on their smaller circumference, being connected to the same axle. The first mentioned roll further in a revolution than the latter—which causes the truck to turn from the direct line of the rails; and it crosses over until the flange strikes the rail, which causes the truck to straighten again for a moment, or until the same cause produces a similar result. Any observant person traveling by rail can feel how frequently these blows are given, and it is easy to understand that a trifling abrasion or irregularity of the rail where the flange strikes may cause the car to jump the track or break the rail, involving, perhaps, the destruction of the train.

"This being the cause, it suggests the following simple and certain remedy: Let each wheel be keyed to a small, separate, independent steel axle, secured to the truck, so that each wheel has its own inside and outside bearings. Beside this, each truck should have a tongue like a common wagon tongue, projecting from it under and toward the centre of the car, the end of the tongue to be kept precisely in the centre of the track by the wheels running diagonally against the inside of each rail. This tongue would always have the effect to steady and steer the truck, preventing at all times its turning so far that the flanges could strike the rail. If railroad gentlemen would condemn, as they should do, the existing faulty system, and go back to the road-wagon and adopt from it the independent wheel and the tongue, we would hear no more necessity for costly steel rails, and no more of cars leaving the track with such dire results. Trains being relieved of the great holdback in the friction of clumsy axles and connected wheels, and the friction caused by striking damaging blows to the rails, a much higher rate of speed could be attained with entire safety, or a much longer train moved at the usual speed with the power now required to move a shorter one."

Electro-Magnetic Brake.

The Massachusetts railroad commissioners, in their last annual report, while discussing the Providence and Worcester Railroad, say,

"Upon some cars of this road Olmstead's electric brake has been applied, which may be put in action on any car by itself, or on all the cars on the train at once, from the engine. The power is furnished by a battery in each car; the electric action keys up a loose wheel on the axle, and this winds up a chain attached to the brake. The advantage of this brake over Creamer's, or any other acting by a spring, is that it is always ready for action, and does not need to be wound up every time it has been used. In the experiments witnessed by the commissioners, it did not appear to have any superiority in quickness of action over the common hand-brake. The superintendent of the road, however, stated that this brake had been in use on five cars for two months, and had given good satisfaction; that it would stop a train in thirty-three seconds in running not much more than the length of the train."

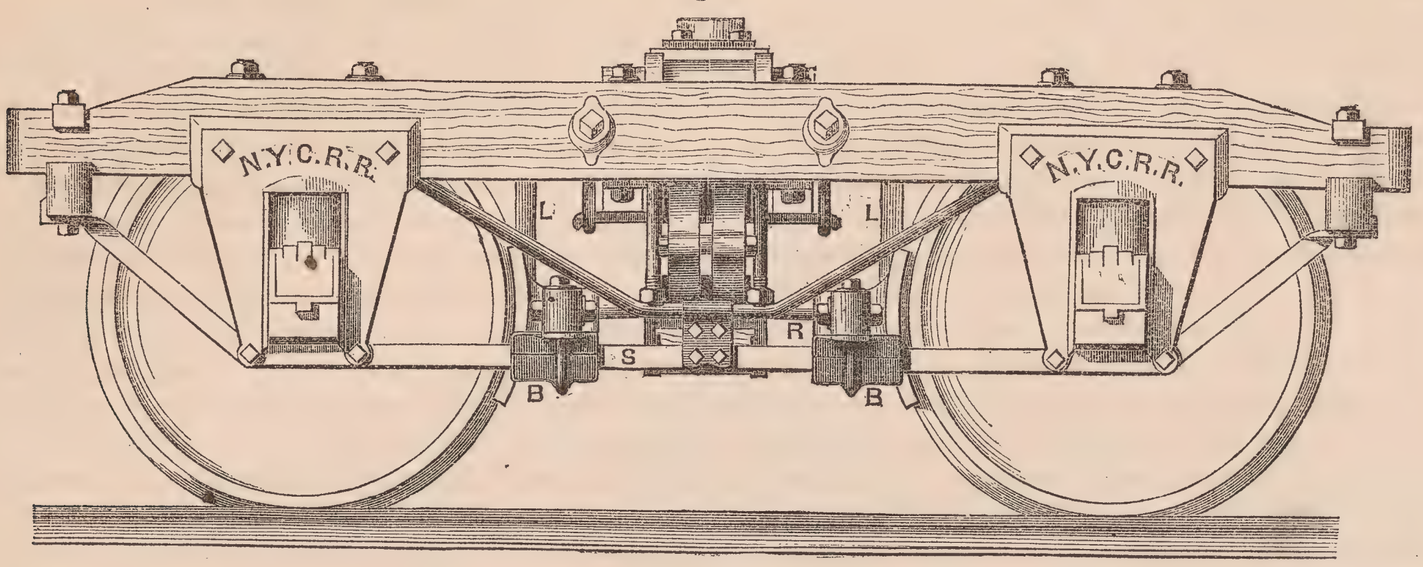
The new Vanderbilt depot for the New-York and New-Haven, New-York and Harlem, and the New-York Central and Hudson River Railroads is rapidly approaching completion. It is situated on Forty-second street between Fourth and Madison avenues, and is 685 feet in length. In substantial construction, magnitude, and adaptation to the uses designed, it will be unsurpassed by any similar structure in the country.

The great Mt. Cenis Tunnel is seven miles long, twenty-six and a half feet wide, and nineteen feet eight inches in height.

The second federal enumeration of the population of New-York City has been completed, and foots up 942,252 as against 925,485 as shown by the enumeration made last summer.

March 1871

Fig. 1.



Jones, Wood & Goewey's Car-Brake.

THE peculiar features of this brake, in its application to a four-wheeled truck, are illustrated in the engravings. It will be seen that the brake-beams are hung between the wheels, and not from the end of the truck-frame, as is usually the case. Fig. 1 is a lateral view of a four-wheeled truck equipped with the brake. Fig. 2 shows the brake-beams and their connections, detached from the truck. The ends of the beams move upon the jaw-brace S in connection with the slides B B, by which means they are held securely in their position, and the brake-shoes applied directly against the centre of the wheel. The beams also work upon the two rods R R, the ends of these rods running into spiral springs, as shown in the cut, the springs keeping the brake-shoes clear of the wheels when the pressure is not on, and avoiding all unnecessary friction, noise, and wear and tear. Fig. 3 shows the form and construction of the slides B B, which are provided with a rubber filling which causes them to work easily upon the jaw-brace, with none of the disagreeable jarring produced by brakes hung from the end of the truck. The position and application of the levers L L are shown in the cuts.

The minor details of the gearing and connections with the truck-frame are not fully exhibited in the engravings, but the essential advantages of the general arrangement are quite apparent. The great requisite of safety is provided for by the thorough manner in which the brake-beams are secured to the truck, it being next to impossible for them to break or become detached so as to get down upon the track—a contingency to which the old method of hanging them from the end of the truck is constantly liable. The excellence of this feature of the brake has been proved by practical test, it having been used for the last six years on the New-York Central and Hudson River roads, where it is now running under not less than four thousand cars. It is also in use on a number of roads in New-England, and at the West and South, its owners asserting that no instance has yet come to their knowledge where it has caused delay or accident by breaking or getting down on the track.

Any further information in regard to it may be obtained by addressing Mr. Joseph Jones, New-York Central Railroad Car-Shops, West-Albany, N. Y.

Fig. 2.

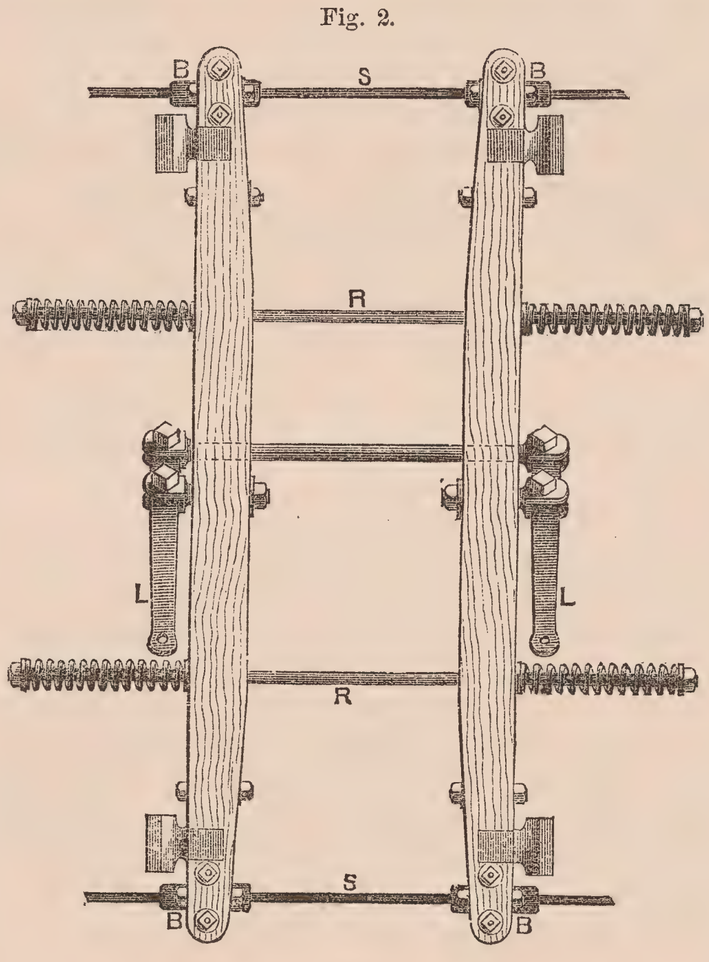
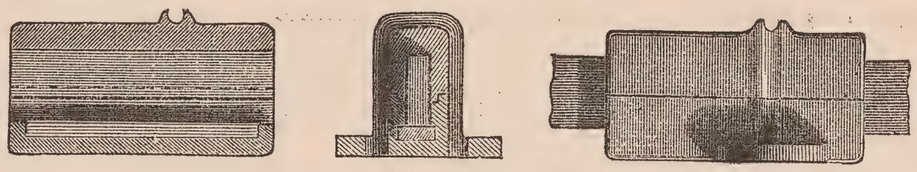


Fig. 3.



IN the Ohio Legislature, a bill has been introduced to limit the charges for seats or berths in sleeping and dining-cars.

THE Wason Manufacturing Company, at Springfield, Mass., is considering the abandonment of its present works, and the erection of new ones.

MODERN investigations give as the exact time occupied by the earth in moving from a point in the ecliptic to the same point again, 365 days, 5 hours, 48 minutes, 49.62 seconds.

OBJECTS seventy-two feet long can be distinctly seen on the surface of the moon by the great telescope of the Earl of Rosse.

Railway Progress.

THE following table will show the progress of railroad construction in this country from 1827 to 1871:

Year.	*Miles open.*	*Yearly increase.*	*Year.*	*Miles open.*	*Yearly increase.*
1827.....	3	..	1850.....	7,475	1,125
1828.....	3	..	1851.....	8,589	1,144
1829.....	28	25	1852.....	11,027	2,438
1830.....	41	13	1853.....	13,497	2,470
1831.....	54	13	1854.....	15,672	2,175
1832...	131	77	1855.....	17,698	1,726
1833	576	445	1856.....	19,251	1,853
1834.....	762	186	1857.....	22,625	3,374
1835.....	918	156	1858.....	25,000	2,465
1836.....	1,102	184	1859.....	26,755	1,665
1837.....	1,431	229	1860.....	28,771	2,016
1838.....	1,843	412	1861.....	30,593	1,892
1839.....	2,224	447	1862.....	31,769	1,176
1840.....	2,797	577	1863.....	32,471	702
1841.....	3,819	522	1864.....	33,860	1,389
1842.....	3,877	558	1865.....	34,442	582
1843.....	4,174	297	1866.....	35,351	900
1844.....	4,231	137	1867.....	36,896	1,545
1845.....	4,522	211	1868.....	38,822	1,926
1846.....	4,870	348	1869.....	42,272	3,450
1847.....	5,336	466	1870.....	48,860	6,588
1848.....	5,682	346	1871.....	51,435	5,574
1849..	6,350	668			

THE Camden and Amboy Railroad Company estimate the cost of repairs per annum for single track, including sidings and turn-outs, at five hundred dollars per mile. This allows one man for a mile of road. They also estimate that a steel rail will last seven years.

MR. L. B. SALISBURY has been appointed Master Mechanic of the St. Louis and South-eastern Railway, in place of Archie Thomson, resigned

Metallic Railway Cars.

THAT iron cars must be heavier than those of wood is the main reason urged against their adoption, although their liability to be hotter in summer and colder in winter may have had considerable to do with the manner in which they have been ignored by railway companies, despite their manifest and, we may add, their manifold advantages. But it appears that weight alone is not, after all, so great a fault in some varieties of railway vehicles; at least this is the inference to be drawn from the sleeping and drawing-room cars, weighing in the neighborhood of thirty tons, which have of late become quite common, especically on Western roads. The reason why weight is a drawback in the one case and not in the other undoubtedly exists in this, that the one giving comfort and pleasure in traveling is made to pay, while the other affording only safety is not. Still we hold, as we have always done, that iron is the only material fit for use in the construction of railway cars, and believe that, if one half the attention was devoted to perfecting the application of metal to this purpose that is now ex pended in the decoration of wooden cars, our railways would soon be supplied with cars as light, as comfortable, and nearly or quite as cheap as the combustible and easily splintered affairs now running on all our railways.

Probably there has never been, in this country at least, a railway car made with proper choice of material and proportion of parts. In such, the structure of the trucks might, perhaps, remain essentially unchanged, although iron in the place of wood would even here be preferable. But the car-body would necessitate a careful combination of steel and iron to unite all available lightness with strength to support the superincumbent load. With these, for all passenger traffic, would need to be used some means of avoiding the undue heating of the car in summer, and the contrary result in the colder seasons of the year. This would be found in the employment of some preparation of paper or woody fibres finely comminuted, and made fire and water-proof by chemical treatment, which, by the way, might be extended even to the upholstery. This done, and proper appliances provided for illuminating and warming, we should have a railway carriage combining the advantages held most important in wooden cars, with those acknowledged to be possible only in iron ones.—*Artisan.*

Safety Bridge-Signal.

A SAFETY SIGNAL, of Mr. Tobey's invention, has been lately applied to the draw of the Kansas City bridge. The St. Joseph *Gazette* says of it:

"On each end of, and about 300 to 350 feet from, the swinging-span, a platform has been erected, standing about twenty feet high. Near the top of this platform a red arm or lever has been fitted together with a large and powerful reflecting-lamp, weighing at least sixty pounds, and said to be the largest signal-lamp made. This lamp turns upon a pivot, showing either a red glass or a white one. The thickness of the glasses is two and a half inches, and when lighted cast a flood of light each way, visible on a straight line fully twelve miles. The arm or lever is used for day signals, and the lamp for night. The signal is so constructed that the bridge can not be opened without turning on the signal of 'Danger.' This is done by means of a huge lock or bolt that secures the bridge. In order to unlock this immense lock, a bolt is drawn, then the 'key-lever' is applied and turned in a half-circle. This draws the bolt holding the bridge at the same time, by means of long steel cords or pulleys and wheels, turns the lamp upon its pivot, and throws out the red arm of 'Danger!' One man attends both ends of the bridge, being enabled, by means of the long steel cords connected with the lock, to regulate each of the distant signals. These signals are complete, and can not fail to insure complete safety so far as the draw-bridge is concerned."

How Conductors are Ruined.

"A REPENTANT railroad detective," who has now embarked in a more respectable calling, makes the following interesting *exposé* of the manner in which innocent railroad conductors are ruined:

"Up to the commencement of the present year I have been employed as a railroad detective Having found a more honest employment, and by way of penance for the past, I feel desirous of making some amends to that class of men that I have heretofore aided, unjustly in many cases, in vilifying, by giving a few facts of the workings of that unscrupulous gang known as railroad detectives, so as to open the eyes of our railroad officials to the injustice of condemning innocent men upon the word of such as now belong to that gang. Any railroad company can ascertain that nine tenths of conductors accused of dishonesty are accused unjustly.

"The plan is, when a contract to work on a road is taken, to first select a victim; to suppose at once that he is guilty, and, reversing the maxim of the common law, to either find or manufacture material to establish the premises. A miracle alone can save him. The reputation of the men set to watch him is at stake, and they feel that it is incumbent upon them to bring him in guilty of fraudulent practices.

"One dodge is to get one to ask a conductor to change a bill for accommodation, while another witnesses the operation and swears—and swears technically true—that he saw the conductor receive money, and neither return nor punch a ticket. Another plan is to buy two tickets at the office in one day, present one to the conductor and retain the other, reporting that the conductor took it but did not punch it. In the mean while, the unsold ticket is given to a confederate, who will start the next day on the same train for the same place, and present the ticket sold the day before to the conductor, who, if he does not notice the date, is trapped. It is a very successful plan, as it hangs both conductor and agent.

"Another dodge is this: several 'spotters' crowd around the conductor, calling at once for tickets, and offering money for different points on the road. The one who pays for the point furthest off will manage to get the ticket from the conductor that belongs to the one paying for the nearest point. Some of the gang then get off at the first station, leaving all the tickets in the hands of one or two, who go the whole distance, giving up the long tickets, and holding the short ones as evidence against the conductor. Here a case is made, and the conductor can not make a satisfactory explanation.

"These are a few of the nefarious and rascally schemes used by detectives. I do not say that conductors, as a class, are any more honest than any other class; but the really dishonest ones are often in the 'ring,' and are seldom reported. These are facts, and I could, were it expedi-nt, give you names of parties whom I know have been unjustly dealt with. I have done all in my power for them, have been to the exe cutive, and in one case have succeeded in having reinstated a man whom I believe to be strictly honest. And I now take another step in the vindication of those wronged through the public prints. Let the managers of railroads see and think, that an evil may be remedied. Let them first select honorable men for this responsible position, and then treat them as men."

The Gauge Question.

THE *Scientific American* says, in regard to the merits of the broad and narrow gauges, "Which, then, will pay best under general and ordinary circumstances? The trials of extremely narrow gauges have all been made under exceptional conditions. The success of such experiments can not, therefore, be conclusive in dociding the question. The extra wide gauges have also been tried under exceptional conditions. It is clear, therefore, that the decision of this question must be based upon general principles rather than on the results of experiments.

"Now, in examining into the elements of cost and expense, which enter into and attend the working of railways, we find so many of them depending upon the fundamental one of gauge, that it has been even maintained that the decrease in these items is nearly in proportion to the narrowing of the gauge; but a closer examination shows this to be a very erroneous conclusion. The right of way costs nearly as much for a narrow gauge road as for a wide one. The expenses of survey, grading, ties, and construction would not be reduced one half, nor any thing approaching it, by reducing the grade one half; and between the three feet six inch gauge, and the two feet six inch gauge, *Engineering* has shown that the difference in cost of construction is only £104 per mile in England. The difference in cost of construction between the gauges is therefore seen to be utterly out of proportion to the difference in carrying capacity. In the comparison of current expenses with carrying capacity, or more properly speaking, with the earnings of a road supposed to be worked to its full capacity, we find a similar disproportion in favor of the wide gauge.

"If, however, a narrow gauge be ample to do the carrying trade of the section through which it runs, the interest on the difference in first cost and in current expenses will be saved to its owners, and it is, therefore, more economical for that particular route. The construction of two narrow-gauge railways to do the work of one wide-gauge road would be, however, absurd in the extreme as a measure of economy.

"The whole matter appears to us to lie in a nutshell. The gauge of a road should be adjusted within practicable limits to the estimated traffic, so far as is consistent with the necessities of running upon other roads the gauges of which are already established. We do not believe any standard width can be selected that will be found adapted to produce maximum economy in all roads alike; and so, though the gauge is a fundamental element in the question of economy, it must always be considered in relation to the attendant circumstances under which the road must be constructed and operated."

The Westinghouse Atmospheric Brake.

A SATISFACTORY trial of this brake was witnessed by some thirty or forty prominent railway men, by invitation of Superintendent Folsom, on the Boston and Providence Railway, on Wednesday last. Without describing the device, which probably is familiar to many of our mechanical readers, we may say that by it the entire control of the train, which consisted of seven cars, is placed in the hands of the engineer. This train ran to Mansfield, making two stops each way. The absence of that jerky motion where brakes are applied by hand, and the graduated but powerful control by which the engineer brought the train to rest at each stopping-place, could not but be noticed. Running at about twenty miles per hour, the train was brought to rest in 312 feet, although it was snowing, and the rails therefore slippery at the trial. Quite a number of roads are experimenting with this brake, and we may add, with general satisfaction. The cost of the device and the royalty claimed by the patentee is quite considerable, but this is a matter of little consequence, if it is found to be efficient in daily practice. By using this brake, two important things are secured —a graduated brake power and the control of the train by the engineer. We have always claimed that these two requisites were of the first importance, and by this device they are secured, so long as no disarrangement of the device, which extends from the engine to every car, is secured. In case of a breakage in any part, it will be useless, and therefore, brakemen must still be carried upon every car in case of emergency. It is but justice to say that the invention is quite simple in its details, and easily applied by competent railway mechanics.—*Railway Times.*

PULLMAN cars are to run over the Vermont Central in a line between Easton and Montreal.

Dangerous Freight-Cars.

THE mother of a brakeman killed on the New-York Central Railway while shackling freight-cars has received from that corporation a verdict of $3500. The ground taken by the jury, was that the cars were so constructed as to be unnecessarily dangerous.

Without reference to the merits or the important legal questions involved in this particular case, it is to be hoped that it will be the means of leading the directors of railway companies to look for themselves whether their arrangements for the coupling of freight-cars are such as ordinary humanity requires, and whether the cheek-blocks on the end of freight-cars project far enough to preserve lives of brakemen whenever the buffer-irons give way or prove defective. Many human beings have been crushed to death between freight-cars. A measurement of cheek-blocks on the New-York Central freight-cars shows that in some instances these cheek-blocks project only 3½ in., sometimes only 4½ in., and sometimes only 6 inches. Thus, if the buffer-irons of opposite cars should be broken and the cheek-blocks come together, there would in some instances be for the brakeman a space of only 7 in., sometimes 9 in., and sometimes only 12 in. Now, according to the testimony of experienced brakesmen, as well as medical testimony, 16 in. is the very least space into which a brakeman should be asked to stand, especially as the freight-cars frequently come together with great force.

At the trifling expense of one or two dollars on each car, each cheek-block could be made to project 8 in., and thus secure for the brakeman a clear space of 16 in., even if both buffer-irons were broken off or driven back under the cheek-blocks. This ought to be done with each new freight-car, and with the old ones whenever brought into the shop for repairs; and thus in one or two years every freight-car on the road would be so constructed as to save the lives of brakemen, and save the company from the appearance of needless cruelty and from expensive lawsuits. Experienced brakemen think the danger attending the coupling of freight-cars is unnecessarily increased by allowing the ends of the side sills to project beyond the cross sills, into the space through which brakemen must pass when going in between the cars to couple them, or when attempting to come out. In view of the great number killed or injured while coupling cars, we think rail-car masters and master mechanics should give this matter serious attention.—*Railway Times.*

India-Rubber Inexhaustible.

THE belt of land around the globe, five hundred miles north and five hundred miles south of the equator, abounds in trees producing the gum of India-rubber. They can be tapped, it is stated, for twenty successive seasons without injury, and the trees stand so close that one man can gather the sap of eighty in a day, each tree yielding, on an average, three tablespoonfuls daily. Forty-three thousand of these trees have been counted in a tract of country thirty miles long by eight wide. There are in America and Europe more than one hundred and fifty manufactories of India-rubber articles, employing some five hundred operatives each, and consuming more than ten million pounds of the gum per year, and the business is considered to be still in its infancy. But to whatever extent it may increase, there will still be plenty of rubber to supply the demand.

THE complete returns of the last census show the total population of the United States, territories, and District of Columbia to be 38,538,180, against 31,443,-321 in 1860. Increase, 22.6 per cent.

THE Allegheny Valley Railroad is having one hundred cars built at the Erie Car-Works, and the same number at the Harrisburg Car Manufacturing Company's works.

National Railway of New-Jersey.

THE *Iron Age*, of New-York, says: "The new National Railway between this city and Philadelphia, which is to be opened to business within eighteen months, is to be completed under the direction of Messrs. Moore, Dillon & Co., to whom the contract has been awarded. The road has already been graded throughout its entire length, and the grade nowhere exceeds twenty-five feet to the mile. This is a consideration of first importance, as the slight grade will not seriously interfere with traction on any part of the line, and the company will be able to run fast trains. This it is proposed to do. The running time between this city and Philadelphia—the distance being between 86 and 87 miles—will be exactly two hours, including stoppages, or at the rate of about 43 miles per hour; a speed which, with good road and rolling stock and a system of management perfect in all its details, will be found entirely practicable. A daily through train, making no stoppages and traveling at the average rate of about 45 miles per hour, will be put on as soon as the business of the road justifies the expense.

"In its construction the road is to be very perfect in all respects. It will have double tracks of the best steel rails, and will be stone ballasted throughout its entire length, thus securing freedom from dust in summer. From the outskirts of Philadelphia to the passenger stations, located at convenient points, trains will be run through a tunnel, in order that a high rate of speed may be maintained within the city limits. The rolling-stock, and especially the passenger-cars, will be of the most approved pattern, and nothing essential to comfort and safety will be neglected."

Street-Cars in Chicago.

SOME time ago, one-horse cars were introduced on the street railways of Chicago, and now the South-side road in that city is about to adopt certain improvements which (according to the *Railway Review*) leave nothing to be desired in the way of cheap and speedy travel. These our contemporary describes as follows:

"The door of the car, instead of being pulled to directly by a strap, occasioning unpleasant noise and sometimes endangering the passenger, is to slide on rollers, being still controlled by the driver, by means of a cord which he pulls when he wishes to open it, and, by letting go the cord, the door closes itself. The step is a one-horse car platform, large and broad, so that a passenger can conveniently step from it outside of the rail, where the road is generally dry. A hand-rail facilitates this movement, and makes it safe, even if the car is in motion. The company expect to get an ordinance passed to prevent persons from riding on the step. Another improvement is an index worked by the driver, which tells the name of the *next* street. By touching a spring, the driver works machinery which turns a cylinder bearing the names of the streets, so that travelers by looking over the front door can tell exactly where they are. Another index in front tells the driver what street is shown inside, so that there can be no mistake. In front of the driver is placed a mirror which shows who come in and go out of the car. This saves the necessity of turning round and neglecting his horse."

BLACK ink, possessing fluidity, depth of color, and permanency, is still a *desideratum*. The pale inks of the present day, when pure, turn black in time, and are lasting. But the blackness, due to the action of tannic acid in the galls on the iron in the copperas, is inferior in color to the carbon inks of the ancients. A carbon ink of the present day always turns mouldy. What is the secret of making a carbon fluid, free from any disintegrating or perishing ingredient?

THEY have an "Anti-gong-and-bell-ringing-and-steam-whistle-exterminating Society" in Springfield, Mass.

Miscellaneous Items.

THE Rhode Island Locomotive Works have a contract with the Great Western Railway of Canada to supply that company with thirty-two locomotives. Sixteen have been already shipped, this week seven more were sent, and the remaining nine will follow this month. The engines have cylinders sixteen by twenty-four inches. The driving-wheels are five and a half feet in diameter. The fire-boxes are built of steel and every thing about them is composed of the very best material. They have a railing a few inches high around the top of the tender, and the bell, which is on the forward platform, is kept incessantly ringing when the engine is in motion by its being connected with the eccentrics. This arrangement has been perfected to meet a demand for something of this sort, brought into existence by the Canadian laws, which require that bells must be kept constantly ringing when locomotives are in motion.

FOR the purpose of warming and ventilating railway carriages, it is proposed by Mr. Grandjeau, of Paris, to use a reservoir of suitable capacity, divided into any number of compartments, in which are placed sponges saturated with the essence of petroleum, mineral essence, or any other carburet of hydrogen of a volatile nature. In the middle of these compartments spaces are left so as to introduce wicks, which should touch the bottom of the receptacle, the number of the same being as large or as limited as desired; the upper part of the wicks enter burners placed at the top of the reservoir. When these burners are lighted, they constitute a regular stove, by means of which the warming of the carriage is effected.

WILLIAM CRANDELL has recently patented a new car-seat, which possesses the convenience of being an easy and comfortable seat by day when in its ordinary position, and by night it can be converted into a lounging or night-chair. It has sufficient height of back to dispense with the head-rest, and enables the occupant to assume such a position as comfort may suggest, and affords him the rest and ease of the sleeping-car without its expense and objectionable features. The seat is richly upholstered, and has all the elegance adopted in modern cars.

THE Milwaukee and St. Paul Railroad Company is using iron trucks for passenger-cars. The first cost of these trucks is greater than that of wooden ones; but they are said to be more serviceable. This road has also adopted the plan of painting the roof-linings of cars after the canvas has been stretched and fastened upon the ceiling. A fresco-painter can then draw his designs without danger of having his work marred by the subsequent stretching of the canvas, as is frequently the case when it is painted before it is put up.

WE find in a recent German journal an account of a new self-acting brake, invented by a German, named Exter, which has been put in very successful and satisfactory operation on the Bavarian railroads. For the purpose of experiment, it has been applied to cars of different sizes, large and small, and on roads of a greater or less degree of inclination; and it has been found that, whatever be the rate of speed, a train can be stopped by means of these brakes in a very short distance. The steam of the locomotive can be shut off and the brake of the tender applied, and this acts immediately upon all the other brakes of the train. In cases where the locomotive was detached from the train and moved off from it, the same result was accomplished.

THE Thomas Iron Company, at Hokendauqua, Lehigh County, was incorporated in 1854, with a capital of $200,000, which has been increased to $1,650,000. The consumption of raw material during the year 1870, the six furnaces being in blast, was as follows: Iron ore, 151,666 tons; coal, 132,597 tons; limestone, 98,593 tons. The manufactured product was 66,719 tons of foundry iron. The number of men employed about the furnaces is between two and three hundred, and a large number in addition are otherwise employed in carrying on the works, and more or less directly connected with the operation of the company.

AN annunciator has been invented by Mr. V. D. Perry, of the Hartford, Providence, and Fishkill Railroad, for use in railroad cars. It consists of a strip of canvas on which the names of all the stations on the road are painted, and this strip is wound about rollers in such a way as to leave a single name visible. It will be adjusted immediately on leaving a stopping place, and thus every individual in the car will know the next station, and the conductor be saved many annoying questions.

THE Ohio and Mississippi Railway Company have recently decided to change their gauge—now 6 feet—to a 4 feet 8½ inch gauge, the ordinary narrow gauge, and have also completed arrangements for a closer alliance with the Baltimore and Ohio, which route, with the Marietta and Cincinnati, under the control of the Baltimore and Ohio, forms the shortest route from the Mississippi River to the Atlantic coast.

THE Russian government has given orders to construct a number of railway carriages with movable axles. These carriages will have the advantage of fitting the broad gauge of their own rails as well as the narrow one adopted in the rest of Europe. In other words, while foreign troops can not be sent to Russia in foreign railway conveyances, the Russians will be able to enter foreign territory in their own.

A THIRTY inch track is to be built from Allentown, Pa., to Harrisburg, by way of Reading and Lebanon, which will test the value of the narrow gauge roads. We are assured that the gentlemen who have undertaken to build the Allentown and Harrisburg narrow gauge road have the means and energy needed to consummate such a work expeditiously, and there are many who are sanguine enough to believe that the little road will become a spirited rival of the East-Pennsylvania and Lebanon Valley roads.

THE directors of the Third Avenue Street Railroad Company, of New-York, propose to run a certain number of clean and elegant cars, equal in comfort to private carriages, between the City Hall and Harlem, provided they can prevail on the Legislature to permit them to charge a higher fare for the better accommodations.

A LOCOMOTIVE engineer, in the London *Times*, speaks of the plan pursued when Her Majesty traveled over the Midland line being the best for safety. The plan, he says, was to have signalmen at every quarter of a mile. This has been done in every case when the queen goes to Balmoral, and is the daily custom on many European lines.

THE Harlem Railroad has nearly completed, at the works in Central Morrisania, a number of new passenger-cars, intended specially for local traffic, and with seats along the side as in horse-cars, instead of crosswise. They are handsomely furnished, and are regarded as much more convenient and popular than those with the usual transverse seats.

THE Hocking Valley Railroad use coal-cars carrying twelve tons each. The flooring is raised in the centre in such a way as to cause the coal to slide out when the side-boards are removed, thus preventing the coal, which is the soft bituminous kind, from being broken up as much as it would be if unloaded in the ordinary way.

A RESIDENT of Taunton, Mass., has obtained his ice for summer use, for several winters past, in the following manner: Procuring about fifty empty flour-barrels, at a cost of twenty cents each, he gradually pours in water, until each contains a solid mass of ice. The barrels are then put away in his cellar, and entirely covered with sawdust. As ice is required, a barrel is tapped.

Extraordinary Cabinet.

In the museum of the St. Petersburg Academy of Sciences there is a very extraordinary cabinet, which was presented to it by the Empress Catharine. On opening it, in front, there appears a beautiful group of bas-reliefs in bronze, superbly varnished, which, by the slightest pressure on a spring, vanishes away, giving place to a magnificent writing-flat, inlaid with gems. The space above this flat is devoted to the keeping of valuable papers or money. The bold hand that should dare to venture to this spot would immediately be its own betrayer; for at the least touch of the table part, the most charming strains of soft and plaintive music instantly begin to play on the ear; the organ from whence it proceeds occupying the lower part of the cabinet behind. Several small drawers for holding the materials for writing likewise start forward, by the pressure of their springs, and shut up again as quickly, without leaving behind a trace of their existence. If one would change the table part of the cabinet into a reading-desk, from the upper part a board springs forward, from which, with incredible velocity, all the parts of a commodious and well contrived reading-desk expand, and take their proper places. But the mechanism of this performance of art, as well as its outward appearance, should be seen, as nothing can be more difficult to describe. The inventor offered this rare and astonishing piece to the Empress Catharine II. for twenty thousand rubles; but she generously thought that this sum would be barely sufficient to pay for the workmanship; she therefore recompensed his talents with a further present of five thousand rubles. His name was Roentgen, and he belonged to the sect of Moravian brethren.

Facetiæ.

"Doctaw, do the choleraw awfect the highaw awdaw?" inquired a New-Orleans exquisite of a physician while the epidemic was prevailing in that city. "No," replied the doctor; "but it's death on d—d fools, and you had better leave town without a moment's delay."

Spooner was arrested for drunkenness, and waxed indignant thereat. "Now, I axes," says he, "if it's right to go and arrest a man for supporting the guv'ment. Every drop of licker I swallows is taxed to support the guv'ment. S'pose all us fel's was to stop drinkin'? Why, the guv'ment'd stop. That's the very reason I drinks. I don't like grog; I mortally hates it. If I follered my own inclination, I'd rather drink buttermilk, or ginger-pop, or soda. But I lickers for the good of my country, and to set an example of virtuous resignation to the rising generation."

A humorous fellow was one day subpœnaed as a witness on a trial for an assault. One of the counsel, who was notorious for brow-beating witnesses, asked him at what distance he was from the parties when the assault happened. He answered,

"Just four feet five inches and a half."

"How came you to be so exact, fellow?" said the counsel.

"Because I expected some fool or other would ask me, and so I measured it."

A lady inquired of the spirit-rappers how many children she had.

"Four," rapped the spirit.

The husband, startled at the accuracy of the reply, stepped up and inquired,

"How many children have *I*?"

"*Two!*" answered the rapping medium.

The husband and wife looked at each other, with an odd smile on their faces, for a moment, and then retired non-believers. There had been a mistake made *somewhere.*

A woman is either worth a great deal or she is worth nothing. If good for nothing, she is not worth getting jealous for; if she is a true woman, she will give no cause for jealousy. A man is a brute to be jealous of a good woman—a fool to be jealous of a worthless one; but he is a greater fool to cut his throat for either of them.

"Bill, did you ever go to sea?" "I guess I did. Last year, for instance, I went to see a red-headed girl; but I only went once." "Why so?" "Because her brother had an unpleasant way of throwing boot-jacks and smoothing-irons at people."

Some sinner has stolen the thermometer from the Fond du Lac *Reporter* office. That paper informs the thief that it will be of no use to him where he is going, as it does not work higher than 313.

"Don't trouble yourself to stretch your mouth any wider," said a dentist to a man who was extending his jaws frightfully, "I intend to stand outside of it to draw your tooth."

A sharp man stopped at a Boston hotel and got supper and lodging, agreeing to kill all the rats on the premises to pay for his entertainment. In the morning the landlord asked him to go in and kill the rats, when the guest asked for an ax, after obtaining which he said, "Fetch on your old rats, Mr. Landlord; I'll kill 'em quicker'n lightin'." He hadn't agreed to catch the rats.

"I have a great love for old hymns," said a pretty girl to her masculine companion. "I am much fonder of young hers," was the reply.

"Doctor, what do you think is the cause of this frequent rush of blood to my head?" "Oh! it is nothing but an effort of nature. Nature, you know *abhors a vacuum.*"

A lady in Louisville swallowed a draught of her husband's hair-dye, mistaking it for medicine. She came near dyeing.

"It is a poor rule that won't work both ways," exclaimed the boy as he threw the ferrule at the schoolmaster's head.

The latest song out is, "Father will Settle the Bill." It is very popular with young ladies.

Epitaph on an Auctioneer.—"Gone."

Table of Interest.—The dinner-table.

"Did ye iver know such a cold summer as this?" asked Mike of a fellow-Irishman. "Yes," answered Pat. "When?" "Last winter, be jabers!"

Car-Wheel Manufacturers.

Barnum & Richardson Manufacturing Co.	Chicago, Ill.
Barney & Smith Manufacturing Co.	Dayton, Ohio.
Bass & Hanna	Fort Wayne, Ind.
Detroit Car-Wheel Works	Detroit, Mich.
Gill & Bidwell	Allegheny City, Pa.
Lobdell Car-Wheel Works	Wilmington, Del.
Moore Elastic Car-Wheel Co	Jersey City, N. J.
Taylor Iron Works	High Bridge, N. J.
Ramapo Wheel & Foundry Co	Ramapo, N. Y.
Scoville J. & N. C	Buffalo, N. Y.

Locomotive Builders.

Baldwin Locomotive Works	Philadelphia, Pa.
Brooks Locomotive Works	Dunkirk, N. Y.
Danforth & Cooke	Paterson, N. J.
Dickson Manufacturing Co	Wilkesbarre, Pa.
Grant Locomotive Works	Paterson, N. J.
Hinckley & Williams	Boston, Mass.
Manchester Locomotive Works	Manchester, N. H.
Mason, William	Taunton, Mass.
McKay Iron and Locomotive Works	Jersey City, N. J.
Portland Company	Portland, Me.
Pittsburg Locomotive Works	Pittsburg, Pa.
Rogers Locomotive Works	Paterson, N. J.
Rhode Island Locomotive Works	Providence, R. I.
Schenectady Locomotive Works	Schenectady, N. Y.
Smith & Porter	Pittsburg, Pa.
Taunton Locomotive Works	Taunton, Mass.

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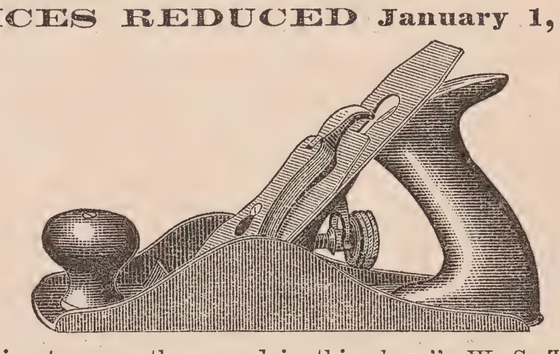

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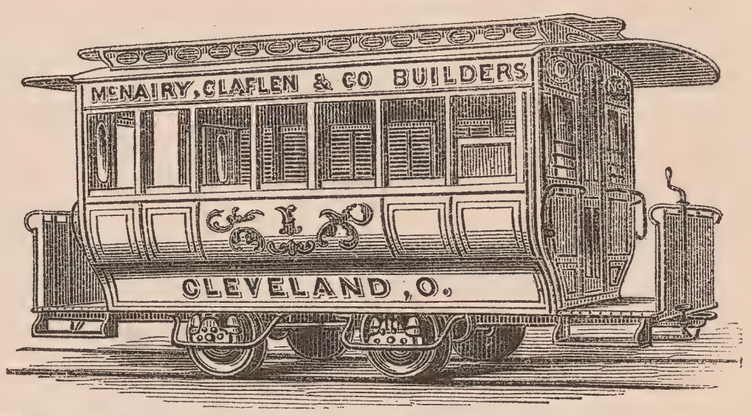

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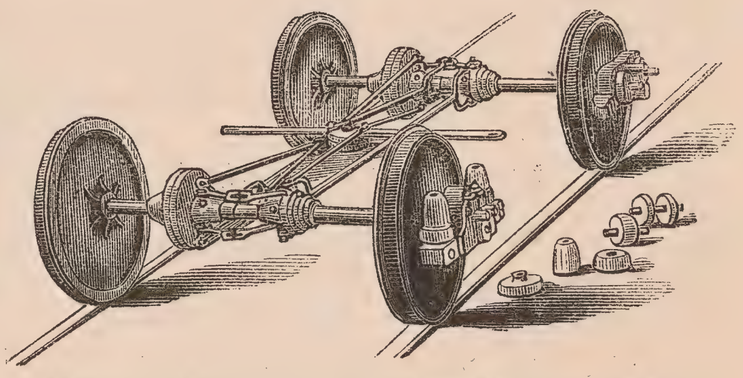

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Alabama & Chattanooga	H. M. Smith	H. M. Smith	Chattanooga, Tenn.
Atlantic & North-Carolina	E. J. Clayton	E. J. Clayton	New-Berne, N. C.
Atlanta & West-Point	Wm. Rushton		Atlanta, Ga.
Atlanta & West-Point	R. D. Cole		Newnan, Ga.
Atlantic & Pacific	J. N. C. Wellinger		Pacific, Mo.
Allegheny Valley	G. W. Glass	R. Gunning	Pittsburg, Pa.
Androscoggin	Ira K. Russell	C. S. Greenwood	Farmington, Maine.
Adirondack			Saratoga, N. Y.
Alexandria, Loudon & Hampshire	Nathaniel Hayes	Nathaniel Hayes	Alexandria, Va.
B			
Bay de Noquet & Marquette	John J. Murphy	H. D. Lyons	Marquette, Mich.
Bangor, Old Town & Milford	J. B. Peckham	John H. Brown	Bangor, Maine.
Bennington & Rutland	John Haining		Rutland, Vt.
Baltimore & Ohio	John C. Davis	John C. Davis	Baltimore, Md.
Bellefonte & Snow Shoe	H. D. Landis	H. D. Landis	Bellefonte, Pa.
Belvidere Delaware	R. McDowell	John Silvers	Lambertville, N. J.
Boston & Albany	Wilson Eddy	F. D. Adams	Springfield, Mass.
Boston & Albany	A. B. Underhill	W.E.Chamberlain	Boston, Mass.
Boston & Providence	George Richards	John Lightner	Roxbury, Mass.
Boston, Clinton & Fitchburg	John Webster	Samuel Stevens	Fitchburg, Mass.
Boston, Concord & Montreal	R. Adams	M. R. Elkins	Lake Village, N. H.
Boston & Maine			Boston, Mass.
Boston & Maine		D. C. Richardson	Lawrence, Mass.
Boston & Lowell & W. L.	L. R. Winslow	S. A. Davis	Boston, Mass.
Blossburg & Corning	O. C. Patchell	O. C. Patchell	Corning, N. Y.
Brockville & Ottawa	Joseph Cockfield	Joseph Cockfield	Brockville, Can.
Blue Ridge			Anderson, S. C.
Burlington & Missouri River	G. Chalender.	G. Chalender.	Burlington, Iowa.
Burlington, Cedar Rapids & Minn.	Wm. Swanston	Wm Swanston	Cedar Rapids, Iowa.
Buffalo & Erie (see Lake Shore)	William Hart	J. N. Mileham	Buffalo, N. Y.
Buffalo & Washington			Buffalo, N. Y.
Boston, Hartford & Erie	I. E. Wiggins	Elias Pratt	Boston, Mass.
Buffalo, Corry & Pittsburg	Thomas Connell	Thomas Connell	Corry, Pa.
Buff. Bayou, Brazos, Colorado	E. Perry	M. Borst	Harrisburg, Tex.
C			
California & Pacific	O. R. Ford	D. Rutherford	Vallejo, Cal.
Camden & Amboy	F. B. Stevens		Hoboken.
	T. T. Kerr	E. Lockwood	Bordentown, N. J.
	Thomas Single		South-Amboy.
Camden & Atlantic	E. Collings	S. Wills	Camden, N. J.
Catawissa	A. J. Prescott	G. P. Fenstermacher	Catawissa, Pa.
Cape Cod	E. A. Walker	William Cannon	Hyannis, Mass.
Calais & Baring	Chas. W. Butler	Chas. W. Butler	Milltown, Me.
Cascade	E. Copley	James Smith	Cascades, W. T.
Catasauqua & Fogelsville	Thomas Evans	Chas. S. Holbach	Catasauqua, Pa.
Carrolton & Oneida	M. T. Wiggins		Carrolton, Ohio.
Charleston & Savannah	H. T. Calder		Charleston, S. C.
Chesapeake & Ohio	W. G. Freeman	J. N. King	Richmond, Va.
Cheraw & Darlington	D. W. Haines		Florence, S. C.
Champlain Trans. Co	H. T. Calder		Burlington, Vt.
Cheshire	F. A. Perry	F. A. Perry	Keene, N. H.
Charlotte & South-Carolina	T. D. Kline	W. T. Brown	Columbia, S. C.
Chicago & North-western		Thomas Hull	Chicago, Ill.
Wiscon. Mad. & Mill. Divis	T. B. Tilton	Henry Hull	Fond du Lac, Wis.
Galena Division	R. W. Bushnell	Hugh Gray	Chicago, Ill.
Chicago & N. W. Iowa Division	C. C. Elliott	William Campbell	Clinton, Iowa.
Chicago & N. W. Peninsula Division	S. L Pierce		Escanaba.
Chicago & Alton	John A. Jackman	R. Reniff	Bloomington, Ill.
Chicago, Burlington & Quincy	C. F. Jauriet	W. W. Wilcox	Aurora, Ill.
Chicago, Cincinnati & Louisville	C. F. Kidder	D. B. Howe	La Porte, Ind.
Chicago, Rock Island & Pacific	T. B. Twombly	J. I. Fogg	Chicago, Ill.
Cleveland, Col., Cin., & Indianapolis	L. S. Young	William F. Smith	Cleveland, Ohio.
Cleveland and Pittsburg	N. E. Chapman	N. E. Chapman	Cleveland, Ohio.
Cleveland, Zanesville & Cincinnati	J. W. Holloway	J. W. Holloway	Akron, Ohio.
Cincinnati, Hamilton & Dayton	William Cullen	W. H. Allison	Cincinnati, Ohio.
Cincinnati & Zanesville	Peter Green	D. J. Jewell	Lancaster, Ohio.
Cincinnati & Indianapolis Junction	O. H. P. Little	W. W. Degnacey	Cambridge, Ind.
Cincinnati, Sandusky & Cleveland	John T. Beatty	William Earick	Sandusky, Ohio.
Concord	E. Studley	M. W. Dickerman	Concord, N. H.
Concord & Claremont	J. N. Lander	A. Langmaid	Concord, N. H.
Connecticut River	John Mulligan	J. Hitchcock	Springfield, Mass.
Contoocook River			Concord, N. H.
Conn. & Passumpsic Rivers	Horace Alden	Horace Alden	Lyndon, Vt.
Cumberland Valley	A. S. Hull	C. W. Nitterhouse	Chambersburg, Pa.
Cumberland & Pennsylvania	W. L. Jordan	J W. Sauerbach	Mt. Savage, Md
Central of Georgia	B. L. Boulineau	C. C. Millar	Savannah, Ga.
Central of New-Jersey	†T. W. Peeples	George Hackett	Elizabethport, N. J.
Central Branch Union Pacific	Wm. D. Rowley	W. A. Grubb	Atchison, Kansas.
Central R. R. of Iowa	H. P. Vedder	H. P. Vedder	Elden, Iowa.
Central Pacific	A. J. Stevens	Benjamin Welch	Sacramento, Cal.
D			
Dayton & Union	A. J. Keenan	J. F. Feicht	Dayton, Ohio.
Danbury & Norwalk	Charles A. Craig	Wm. W. Bedient	Danbury, Ct.
Dayton & Michigan	William Cullen,	W. H. Allison	Cincinnatti, Ohio.
Delaware, Lackawanna & Western	Walter Dawson	Robert McKenna	Scranton, Pa.
Des Moines Valley	Morris Sellers	R. E. Smith	Keokuk, Iowa.
Detroit & Milwaukee	B. Briscoe	B. Briscoe	Detroit, Mich.
Delaware & Hudson Canal Co	James Dickson	Thomas Orchard	Carbondale, Pa.
Dorchester & Delaware			Cambridge, Md.
Dubuque South-western	J. M. Williamson	J. M. Williamson	Farley, Iowa.
Dutchess & Columbia			Washington, N. Y.
E			
Eastern		J. P. Somerby	Salem, Mass.
Eastern	John Thompson		East-Boston, Mass.
East-Tennessee & Virginia	Jos. Armbruster	Jos. Armbruster	Knoxville, Tenn.
East-Tennessee & Georgia	Eli Hixon		Knoxville, Tenn.
East-Pennsylvania	J. M. Geary	Samuel Reeves	Reading, Pa.
Erie Railway	*E. O. Hill		Susquehanna, N. Y.
Erie Railway	James B. Gregg		
Erie Railway	H. L. Brown	C. A. Smith	Jersey City, N. J.
Erie Railway	M. E. Brown	M. Wilder	Buffalo, N. Y.
Erie Railway	W. E. Cooper	W. E. Cooper	Hornellsville, N. Y.
Erie Railway		W. E. Rutter	Elmira, N. Y
Evansville & Crawfordsville	John L. White	A. Sharra (fore'n)	Evansville, Ind.
Evansville, Henderson & Nashville	W. H. McCafferty	W. H. McCafferty	Nashville, Tenn.
European & North Am. (of Maine)	A. O. Bailey	J. H. Brown	Oldtown, Maine.
Erie & Pittsburg	John Young	John Young	Erie, Pa.
Eldora			Dubuque, Iowa.
F			
Florida	A. W. Taylor	G. Hernandez	Fernandina, Fla
Flint & Pere Marquette	Sanford Keeler	Sanford Keeler	East-Saginaw, Mich.
Fitchburg	Geo. A. Cooledge	Enos Varney	Charlestown, Mass.
Fitchburg & Worcester			Fitchburg, Mass.
G			
Grand Trunk	*Richard Eaton	J. W. W. McWood	Montreal, Canada.
Galveston, Houston & Henderson	William McBeth	E. J. Sherman	Galveston, Texas.
Grand River Valley		James Potts	Jackson, Michigan.
Grand Rapids & Indiana			Fort Wayne. Ind.
Great Western of Canada	*Wm. A. Robinson		Hamilton, Canada.
Georgia	William Hardman	Samuel Frost	Augusta, Ga.
Greenville & Columbia		J. O. Meredith	Helena, S. C.
H			
Hanover Branch	John J. Bingley	Henry Britcher	Hanover, Pa.
Hartford & New-Haven	N. Slingland	F. Leppense	Hartford, Ct.
Hannibal & St. Joseph	H. A. Towne	H. C. Whiting	Hannibal, Mo.
Hartford, Providence & Fishkill	Edwin Garfield	V. D. Perry	Hartford, Ct.
Hackensack & New-York	Abra'm Angausen		Hackensack, N. J.
Hastings & Dakota	C. C. Clements		Hastings, Minn.
Housatonic	C. R. Morris	J. Ferris	Bridgeport, Ct.
Houston & Texas Central	Reuben B. Snyder	J. F. Rice	Houston, Texas.
Houston Tap & Brazoria	A. Malsch	R. H. Yeomans	Houston, Texas.
Huntington & Broad-Top Mountain	D. G. Gilchrist	M. Tellerhoof	Saxton, Pa.
Hempfield	T. Marsh		Wheeling, Va.
Hudson River	Wm. Buchanan	Wm. S. Town	New-York.
Hudson River	John Dykeman	Charles D. Mills	East-Albany, N. Y.
I			
Indianapolis, Cincinnati & Lafayette	H. M. Britton	H. M. Britton	Cincinnati, Ohio.
Indianapolis, Peru & Chicago	John McKenna	John McKenna	Peru, Ind.
Illinois Central	S. Hayes	C. Scoville	Chicago, Ill,
Iowa & Missouri State Line			Farmington, Iowa.
Iron	Perry Scott	Clem. Roetling	Ironton, Ohio.
Indianapolis & St Louis	C. E. Benton	C. E. Benton	Mattoon, Ill.
Indianapolis, Bloomington & Western		S. S. Smith	Urbana, Ill.
J			
Jeffersonville, Madison & Indiana	Reuben Wells	John Higgins	Jeffersonville, Ind.
Jackson, Lansing & Saginaw	Andrew Wilson	A. Wilson	Jackson, Michigan.
K			
Keokuk & St. Paul	P. R. Sutton	Wm. McElroy	Keokuk, Iowa.
Knox & Lincoln			Bath, Maine.
Kentucky Central	J. R. Ledyard	J. L. Hackenthorn	Covington, Ky.
Knoxville & Charleston			Knoxville, Tenn.
Kansas Pacific	Geo. W. Cushing	Geo. W. Cushing	Wyandotte, Kansas.
Kalamazoo, Allagan & Grand Rapids			Kalamazoo, Mich.
Kansas City, St. Joseph & Council Bluff	H. L. Cooper		St. Joseph, Mo.
L			
Lake Erie & Louisville	John Pero		Fremont, Ohio.
Lackawanna & Bloomsburg	Chas. Graham		Kingston, Pa.
Lehigh Valley	J. Kinsey.		South-Easton, Pa.
Lehigh Valley	P. Hofecker	E. R. Brown	Weatherly, Pa.
Lehigh Valley	A. Mitchell	Mauch Chunk, Pa.	Delano, Pa.
Lehigh Valley	D. Clark		Hazelton, Pa.
Lehigh & Susquehanna	L. C. Brastow	L. C. Brastow	Wilkesbarre, Pa.
Lehigh & Susquehanna	Wm. H. Brown		Mauch Chunk, Pa.
Leavenworth, Lawrence & Gal	S. Philbrick		Lawrence, Kansas.
Lewy's Island	C. W. Button	Damase Merceir	Milltown, Maine.
Little Rock & Fort Smith			Little Rock, Ark.
Lebanon Springs			Burlington, Vt.
Little Miami, Col. & Xenia	J. H. Setchel	M. P. Ford	Cincinnati, Ohio.
London & Port Stanley			London, C. W.
Louisville, New-Albany & Chicago	Jacob Losey	Jacob Losey	New-Albany, Ind.
Long Island	Chs. A. Thompson	E. A. Olmstead	Hunter's Point, L.I.
Louisville, Cincinnati & Lexington	John Skidmore	Theo. G. Shaw	Louisville, Ky.
Louisville & Nashville	Thatcher Perkins	Thatcher Perkins	Louisville, Ky.
Lake Shore & Michigan Southern	†James Sedgley		Cleveland, Ohio
Michigan Southern Division	James K. Taylor	John Kirby	Adrian, Mich.
Buffalo Division	B. H. Kidder.		Buffolo, N. Y.
M			
Macon & Augusta			Macon, Ga.
Maine Central	J. W. Philbrick	J. W. Philbrick	Waterville, Me.
Macon & Western	B. Pope Freeman	James A. Knight	Macon, Ga.
Manchester & Lawrence	Edward Studley	M. W. Dickerman	Concord, N. H.
Macon & Brunswick	M. Thornton	M. Thornton	Macon, Ga
Maysville & Lexington			Maysville, Ky.
Marietta & Cincinnati	E. Bosley	E. Bosley	Chillicothe, Ohio.
Memphis, Clarksville & Louisville			Clarksville, Tenn.
Memphis & Little Rock	D. R. Wing		Little Rock, Ark.
Memphis & Charleston	Michael Burk	A. W. Drew	Memphis, Tenn.
Memphis & Charleston	L. M. Sellars	Thomas Varun	Huntsville, Ala.
Mineral Point	Robert Hay		Mineral Point, Wis.
Mississippi & Tennessee	Henry Teague	Henry Teague	Memphis, Tenn.
Mississippi Central	Henry Gibbon	John E. Becton	Water Valley, Miss.
Maryland & Delaware	Samuel Peters		Greensboro, Md.
Mississippi, Gains. & Tus			Gainsville, Ala.
Midland Pacific			Nebraska City, Neb.
Milwaukee & St. Paul		Wm. E. Kettridge	Milwaukee, Wis.
Milwaukee & St. Paul		John Baillie	Milwaukee, Wis.
Minnesota, Iowa & Dakota Division	James Waters	D. F. Wilson	Minneapolis Minn.
Michigan Central	A. S. Sweet, Jr	J. B. Sutherland	Detroit, Mich.
Montgomery & West-Point	J. McVey	W. H. Daniels	Montgomery, Ala.
Montgomery & Eufaula	James McCann	I. E. Holmes	Montgomery, Ala.
Mobile & Montgomery	James McFarland	L. Barham	Montgomery, Ala.
Mobile & Girard	William Eyles	A. J. Nix	Girard, Ala.
Mobile & Ohio	L. J. Fleming	John McHugh	Mobile, Ala.
Missouri River, Fort Scott & Gulf	John McCrumm		Kansas City, Mo.
N			
Nashville & Chattanooga	John U. Eastman	J. G. Sawyer	Nashville, Tenn.
Nashville & Decatur	C. B. Knowles	C. B. Knowles	Nashville, Tenn.
New-Bedford & Taunton	Robert Chase	Robert Chase	New-Bedford, Mass.
New-Canaan			New-Canaan, Ct.
New-Brunswick & Canada	T. Armstrong	T. Armstrong	Saint Andrew's, N.B.
New Haven & Northampton	Henry Fox	Henry Fox	Westfield, Mass.
New-York & Oswego Midland	Wm. H. Griggs		Oneida, N. Y.
New-York & Harlem	Wm. M. Strong	Leander Garey	New-York.
New-York Central	* C. T. Ham	Joseph Jones	Albany, N. Y.
New-York Central	G. B. Van Vorst		Albany, N. Y.
New-York Central	Henry Watkeys		Syracuse, N. Y.

* General Master Mechanic.

† Mechanical Engineer.

* Mechanical Superintendent.

† General Master Mechanic.

‡ General Master Mechanic and Master Car-Builder.

Railroad.	*Master Mechanic.*	*Master Car-Builder.*	*Residence.*
New-York Central	Edward L. Tyler		Rochester, N. Y.
New-York Central		Wm. Johnson	Buffalo.
New-York & Flushing			Flushing, L. I.
New-York, Providence & Boston	Jas. H. Anderson	Jas. H. Anderson	Providence, R. I.
New-York & New-Haven	H. Kittendorf	M. C. Andrews	New-Haven, Ct.
New-London Northern	J. W. Dow	George Boyden	New-London, Ct.
New-Jersey & Transportation Co	John Headden	David H. Baker	Jersey City, N. J.
New-Haven & Derby			New-Haven, Ct.
New-Orleans, Opelousas & Gt. Western	John McCluskey	Matthew Nolan	Algiers, La.
New-Lisbon			Leetonia, Ohio.
New-Orleans & Ohio	John R. Jordan	John R. Jordan	Paducah, Ky.
New-Orleans, Jackson & Gt. Northern	John Conlon	Charles Bartine	New-Orleans, La.
New-Haven, Hartford & Springfield			Hartford, Ct.
Naugatuck	R. Post	George W. Gray	Bridgeport, Ct.
Newark & Bloomfield	Luke F. Tronson		Hoboken, N. J.
Nova Scotia	W. Johnson		Bedford, N. S.
North-Missouri	John Calhoun	C. S. Buck	St. Louis, Mo.
North-Carolina	E. Wade	B. G. Sergeant	Co. Shops, N. C.
New-Orleans, Mobile & Chattanooga	Josiah Bettis	George Shattuck	
Northern Central	C. M. Lewis		Baltimore, Md.
Northern Central		G. W. Demarest	York, Pa.
North-Lebanon		Henry B. Oves	Lebanon, Pa.
North-Pennsylvania	Franklin Roop	Franklin Roop	Philadelphia, Pa.
North Eastern	D. W. Haines	A. M. Corrie	Florence, S. C.
Northern	James W. Lander	Albert Langmaid	Concord, N. H.
Northern of New-Jersey	T. W. Demarest		New-York.
Norwich & Worcester	Richard Colburn	G. R. Bentley	Norwich, Ct.
Northern of Canada	James W. Forster		Toronto, Can.
Norfolk & Petersburg	J. S. Whitworth	J. S. Whitworth	Norfolk, Va.

O

Ogdensburg & Lake Champlain	William A. Short		Malone, N. Y.
Oswego & Syracuse	Josiah Bettis	J. H. Parker	Oswego, N. Y.
Ohio & Mississippi	George W. Harris	M. M. Martin	Cochran Shops, Ind.
Old Colony & Newport	C. F. Bullock	A. Gleason	Boston, Mass.
Orange, Alexandria & Manassas	James E. Waddy	John T. Nalls	Alexandria, Va.
Oil City & Pithole	George Thompson		Pithole, Pa.
Oil Creek & Alleghany River	J. S. McElroy	Jacob Williams	Corry, Pa.
Oil Creek & Alleghany		H.J.Bookhammer.	Oil City, Pa.

P

Panama	Tnomas Cobb	J. G. Wilson	Aspinwall, N. G.
Pacific of Missouri	Jacob Johann	Jacob Johann	St Louis, Mo.
Paterson & Newark			Paterson, N. J.
Pennsylvania	* Isaac Dripps		Altoona, Pa.
Pennsylvania	H. D. Garrett	I. W. Van Houten.	W. Philadelphia, Pa.
Pennsylvania	M. A. Shattuck	Samuel W. Myers.	Harrisburg, Pa.
Pennsylvania	T. W. Worsdell	John P. Levan	Altoona, Pa.
Pennsylvania	D. O. Shaver	R. S. Ramsey	Pittsburg, Pa.
Philadelphia & Erie	T. J. Hamer	George J. Mason.	Sunbury. Pa.
	W. L. Foster	Robt.M.Messimer.	Renovo, Pa.
	W. L. Holman	Wm. P. Newcomb.	Kane, Pa.
	W. T. Smith	John Quigley	Erie, Pa.
Philadelphia, Wilmington & Baltimore	George W. Perry	George W. Perry	Wilmington, Del.
Philadelphia & Reading	John Wootten	Aaron Steinbach	Reading, Pa.
Philadelphia, Germ'n & Norris'n	John Moyer	Nathan Pawling	Philadelphia, Pa.
Philadelphia & Baltimore Central	S. D. Danfield	SamuelD.Danfield.	Chester, Pa.
Pittsburg, Cincinnati & St. Louis	James Ball	James Ball	Logansport, Ind.
	Robert Curtis	Theo. Chamberlain.	Columbus, Ohio.
	Thomas Denmead		Dennison, Ohio.
	Thomas V. Losee.	John Gottschall	Indianapolis, Ind.
		James McGee	Steubenville, Ohio.
Pittsburg, Fort Wayne & Chicago	S. M. Cummings	John Marquis	Alleghany, Pa.
Pittsburg, Fort Wayne & Chicago	J. M. Boon	Wm. Waddington.	Fort Wayne, Ind.
Pittsburg & Connellsville	D. P. Rennie	J. M. Rutter	Connellsville, Pa.
Peoria, Pekin & Jacksonville	J. S. Hurd	J. S. Hurd	Pekin, Ill.
Peninsular			Battle Creek, Mich.
Portland & Rochester	Jas. S. Drake	Samuel Dean	Portland, Me.
Portland & Kennebec	John Ellis	J. W. Trussel	Augusta, Me.
Portland & Oxford Central	Geo. W. Battles	Geo. W. Battles	Buckfield, Me.
Portland, Saco & Portsmouth	John Donnell		Portland, Me.
Port Royal			Beaufort, S. C.
Port Hope, Lindsay & Beaverton	H. G. Taylor	H. G. Taylor	Port Hope, Can.
Port Huron & Lake Michigan			Port Huron, Mich.
Providence, Warren & Bristol	Rufus Smith	J. Brightman	Bristol, R. I.
Portsmouth, Gt. Falls & Monmouth	James Tucker	E. Fall	Union Village, N.H.
Petersburg	R. B. Adams	Alex. Wright	Petersburg, Va.
Providence & Worcester	Joseph Kelly	Olney L. Smith	Providence, R. I.

R

Raritan & Delaware Bay	Rufus Blodgett	Rufus Blodgett	Manchester, N. J.
Raleigh & Gaston	J. B. Gayle	J. B. Gayle	Raleigh, N. C.
Rensselaer & Saratoga	W. B. Gage		Troy, N. Y.
Richmond, Fredericksburg & Potomac	H. Kuhn	W. H. Trainham	Richmond, Va.
Richmond & Danville	John McFarland	B. P. Owen	Richmond, Va.
Richmond & Petersburg	Wm. Piermont	J. J. Martin	Richmond, Va.
Richmond & York River			Richmond, Va.
Rome, Watertown & Ogdensburg	Wm. Jackson	Wm. Jackson	Rome, N. Y.
Reading & Columbia	B. Van Lew		Columbia, Pa.
Rome, Georgia	O. W. Harbin	O. W. Harbin	Rome, Ga.
Rochester & Genesee Valley	M. Wilder	M. E. Brown	Buffalo, N. Y.
Rockford, Rock Island & St. Louis	D. R. Grant		Beardstown, Ill.
Rock Island & Peoria			Rock Island, Ill.
Rutland	N. L. Davis	M. M. Crooker	Rutland, Vt.

S

San Francisco & San José	R. B. Bishop	Frank Bellisle	San Francisco, Cal.
St. Croix & Lake Superior			New-York City.
St. Lawrence & Ottawa	Calvin Dame	Calvin Dame	Prescott, Canada.
St. Paul & Pacific	C. N. Parker, Jr	C. B. Boynton	St. Paul, Minn.
St. Louis & Iron Mountain	O. A. Haines	Oscar Doolittle	Carondelet, Mo.
Sandusky, Mans. & Newark		Charles Scoeby	Sandusky, Ohio.
St. Joseph Valley			Kalamazoo, Mich.
San Antonio & Mexican Gulf	W. T. Bingham		Victoria, Texas.
South Side of Long Island			New-York.
St. Paul & Sioux City	Jas. G. Butterfield		Shakopee, Minn.
St. Louis, Vandalia & Terre Haute	S. Sandborn		St. Louis, Mo.
South-Carolina	W. B. Smith	John Reed	Charleston, S. C.
South-Side of Virginia	J. T. Robinett	J. T. Robinett	Petersburg, Va.
South & North Alabama	S. Schermerhorn	M. S. Riddle	Lime Station, Ala.
Southern Minnesota	Wm. Lininger	W. H. Dunham	Hokah, Minn.
South-Pacific	John Hewitt		Pacific, Mo.
South-Western of Georgia	C. D. Wall	F. H. Alley	Macon, Ga.
South Shore	Warren E. Ray		Cohasset, Mass.
Shore Line		C. F. Platt	New-Haven, Ct.
Stanstead, Shefford & Chambly	W. H. Smith	M. Sessions	Waterloo, C. E.
Schuylkill & Susquehanna	John E. Wootten	John E. Wootten	Reading, Pa.
Selma & Meridian	John Davis	G. K. Ashley	Selma, Ala.
Seaboard & Roanoke	J. B. Pendleton	J. B. Pendleton	Portsmouth, Va.
Stonington & Providence	J. H. Henderson	J. H. Henderson	Providence, R. I.
Selma, Rome & Dalton	Geo. S. Howden	W. W. Peirce	Selma, Ala.
Sioux City & Pacific		J. R. Dow	Missouri Val., Iowa.
Spartanburg & Union	J. N. Benner	Jacob Rice	Union C. H., S. C.
Sheboygan & Fond du Lac	J. H. Erwin	J. H. Erwin	Sheboygan, Wis.
Sullivan & Erie			Tonawanda, Pa.
Syracuse & Binghamton, N. Y.	B. G. Merrill	B. G. Merrill	Syracuse, N. Y.
Sycamore & Cortland			Sycamore, Ill.

* Superintendent of Motive Power and Machinery.

Railroad.	*Master Mechanic.*	*Master Car-Builder.*	*Residence.*
T			
Taunton Branch			Taunton, Mass.
Tioga	Peres Bonny	D. H. Stratton	Blossburg, Pa
Texas & New-Orleans	R. B. Baer		Houston, Texas.
Tennessee & Pacific			Nashville, Tenn.
Terre Haute & Indianapolis	C. R. Peddle	H. Kirmse	Terre Haute, Ind.
Toledo, Wabash & Western	W. F. Ray		Fort Wayne, Ind.
Toledo, Wabash & Western	T. G. Gorman	David Hoit	Toledo. Ohio.
Toledo, Peoria & Warsaw	A. H. De Clerq	R. M. Hemphill	Peoria. Ill.
Troy & Bennington			Troy, N. Y.
Troy & Boston	Foster Church	R. V. Coon	Troy, N. Y.
U			
Union Pacific	I. H. Congdon	Geo. E. Stevens	Omaha, Nebraska.
Utica & Black River	John Bailey.	David James	Utica, N. Y.
Utica, Chenango & Susquehanna	C. H. Brown		Utica, N. Y.
V			
Virginia & Tennessee	F. Herk	I. A. Caldwell.	Lynchburg, Va.
Vicksburg & Meridian	Jas. B. Brown		Vicksburg, Miss.
Vineland			Vineland, N. J.
Vermont Central	J. M. Foss	Milton Sessions	St. Albans, Vt.
Vermont & Massachusetts	W. F. Kenney	Jacob Marsh	Fitchburg, Mass.
Vermont Valley			Rutland, Vt.
W			
Washington, Alex. & Georgetown			Washington, D. C.
Warwick Valley			Warwick, N. Y.
Wicomico & Pocomoke			Berlin, Md.
Wilmington & Manchester	George Hall	William Kinyon.	Wilmington, N. C.
Wilmington, Charlotte & Rutherford	W. A. Gill	Thomas Myers	Laurenburg, N. C.
Winchester & Potomac			Winchester, Va.
Westchester & Philadelphia	P. C. Clark	P. C. Clark	Philadelphia, Pa.
Wilmington & Weldon	John F. Devine	John F. Devine	Wilmington, N. C.
West-Jersey	W. McAllister	C. C. Williams	Camden, N. J.
Western Maryland	R. V. Dohoney	J. H. Nussear	Union Bridge, Md.
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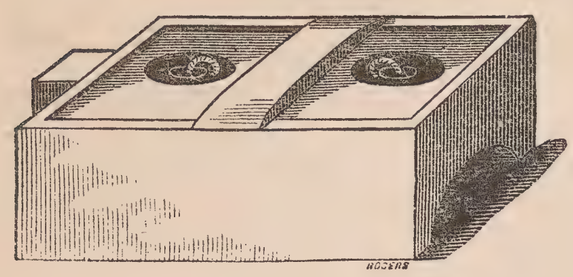

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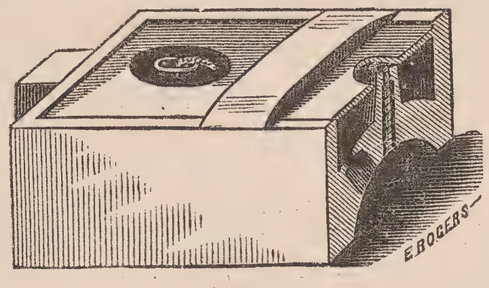

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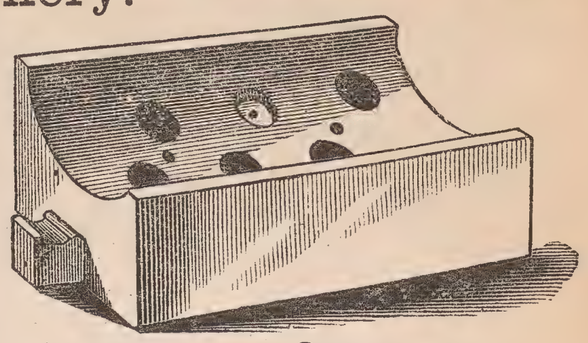

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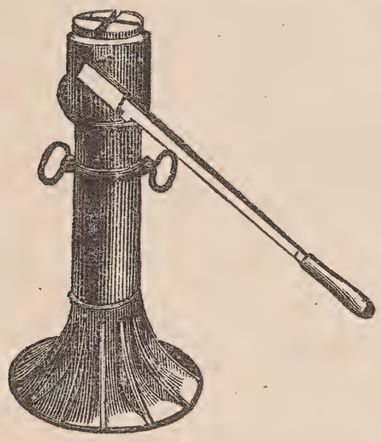

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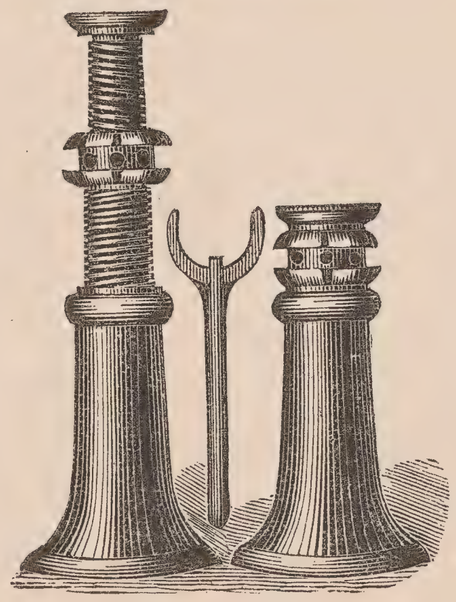

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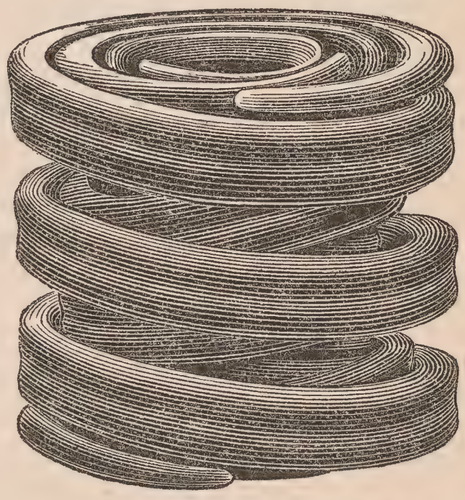

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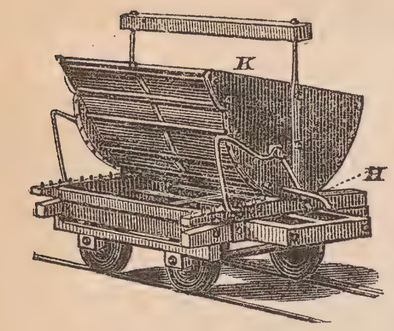

Fig. No. 1, Car Loaded and at Rest.

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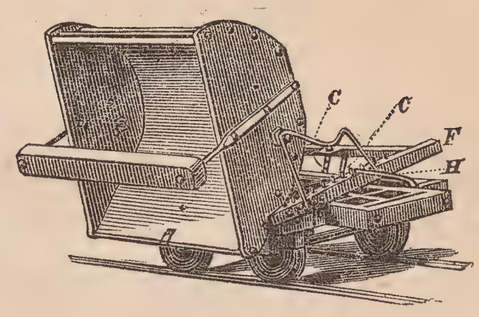

Fig. No. 2, Car Dumped.

TO DUMP THE CAR.

The brakeman seizes the lever, H, and raises it about a foot, thus releasing the hopper from the catch, C, and the tilting frame, F, from the catch, C, when the hopper, K, yields to the force of gravity and rolls over to the position shown in Fig. 2.

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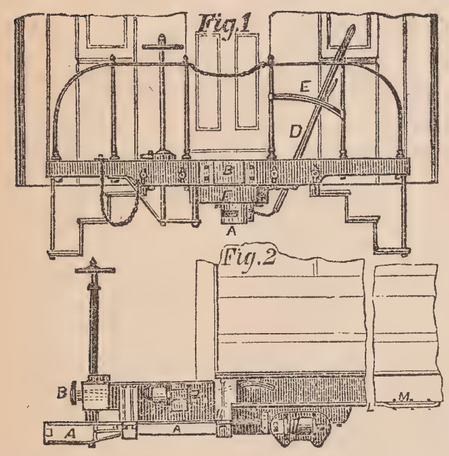

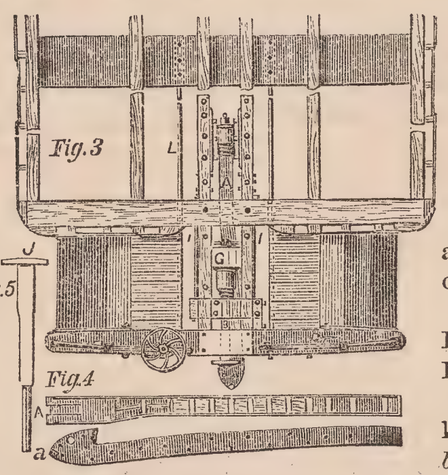

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DESCRIPTION.

Figure 1 is an elevation; Figure 2, a longitudinal section; Figure 3, a plan of an end of a car to which the arrangement has been applied; and Figures 4 and 5 show top and side views of the "Hook" and "Buffer," drawn on a larger scale than that of Figures 1, 2, and 3.

The letters refer to the same parts in all the figures. A is the coupling "Hook," B the "Buffer," C the "Stop," D the "Lever," E the "Quadrant Ratchet," F the "Truss Beam," G the "Spring Beam," H the "Suspender Beam," I the "Upward Trusses," K the "Main Spring," L the "Downward Trusses," and M the "Bolster."

The Platforms, instead of being located below the centre line of the main sills of the cars, are placed *in* that line, and held there by the Trusses I and L, so that the point of contact (in Buffers B) is *in* the said centre line and *not below* it.

The coupling "Hook" A is attached to the draw spring the same as the ordinary draw head, and at the same height above the track, but in such a manner that the outer end is free to move laterally for a short distance. The Coupling Hook projects beyond the platform. The Stop C is placed under the Buffer Beam to prevent accidental uncoupling. When two cars are brought together, the Coupling Hooks, from *their shape*, push each other aside, until the Buffers B are compressed hard on the Buffer Springs, then—*the points of the hooks having passed each other sufficiently far*—the Hooks are carried forward by their main-springs, and thus the "*Coupling*" and "*Compression*" are both effected automatically *and at the same time*, and without the use of links and pins. When two cars are thus coupled together, the *head* of the *Hook* of each car is under the Buffer Beam of its opposite car, and the platforms are close together, (about 4 inches apart.) The effect of this is, *one platform can not be forced over the other*, nor can a *child* fall between the platforms; the dust and rain are nearly all shut out; the "Compression" makes the train run steadily, and prevents all jerking at starting and stopping.

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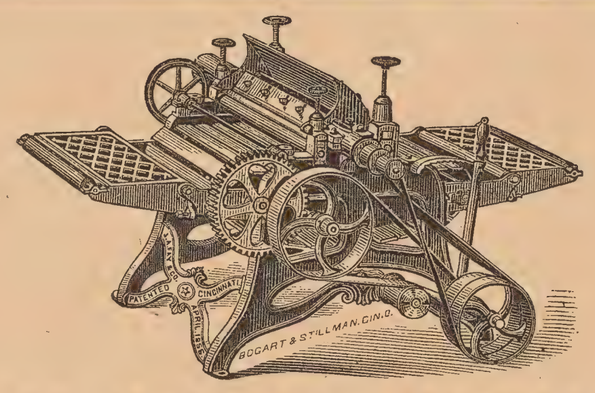

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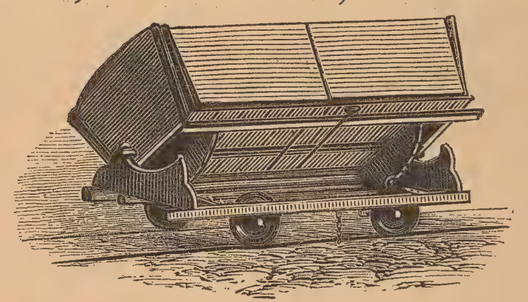

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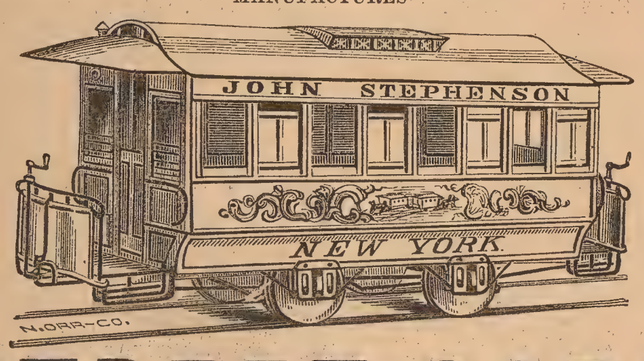

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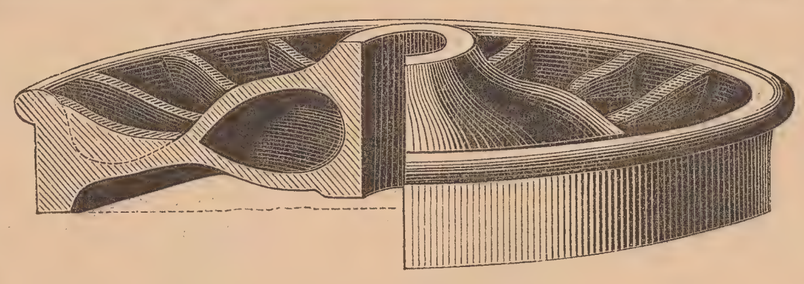

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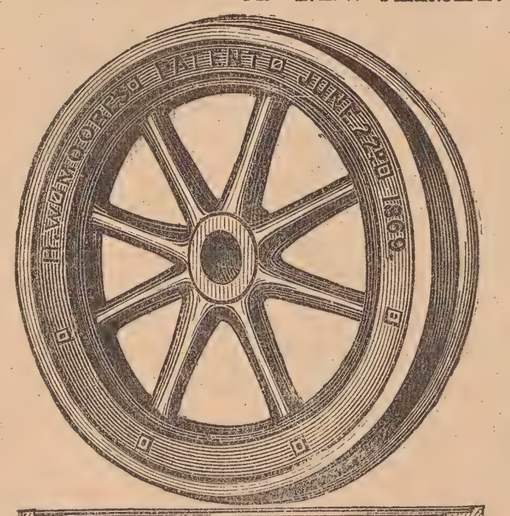

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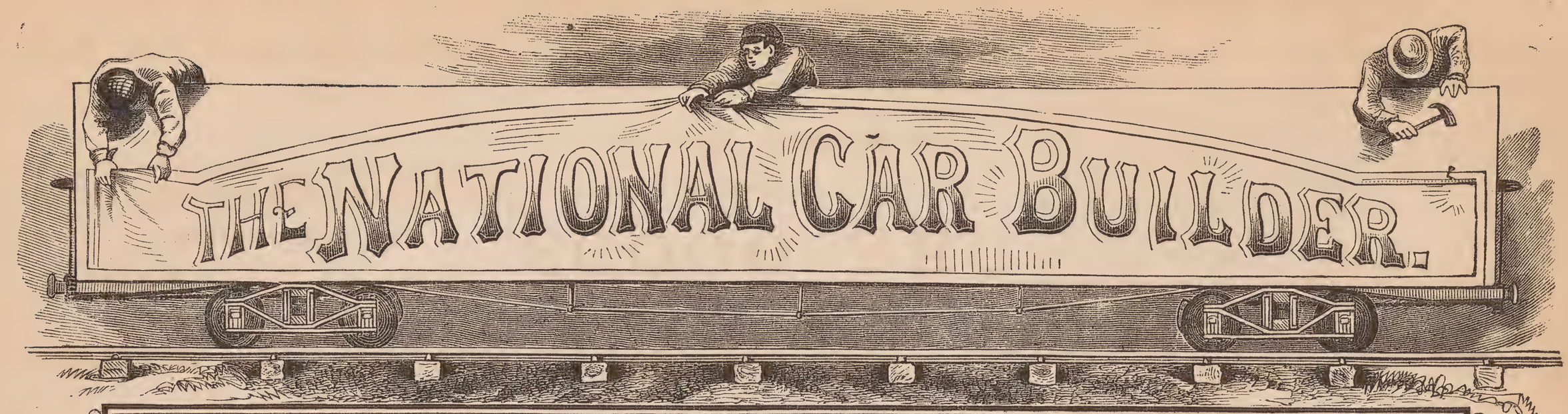

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Warming and Ventilation of Railroad Cars.

CONTINUED.

CONSIDERABLE diversity of opinion exists in regard to the quantity of fresh air which should be supplied for each person in a given time, in order to make the atmosphere of a room perfectly healthful. There is no doubt that air which has once been breathed, has been deprived of a portion of the element which sustains life, and that other ingredients, which are more or less injurious, have been added to it. If each occupant of a room or of a railroad car exhaled his or her breath through a tube which led into the external air, and inhaled the atmosphere from the inside, then very little more than the quantity which passes through the lungs, or about 350 cubic feet in twenty-four hours per passenger, would be enough to keep the air perfectly pure; in other words, if the breath of each person could be removed as soon as it leaves the lungs, ventilation would then be perfect. But each one of the occupants expires his breath, which has been deprived of oxygen and charged with carbonic acid and other impurities, into the room or car, where it mingles with the pure atmosphere, and the whole is thus contaminated to a greater or lesser degree, according to the proportion which the quantity of air in the room bears to the number of people who are breathing it. The greater the number of people, or the smaller the room, the sooner will the air become unfit to breathe.

The degree of impurity which can be inhaled without injury is still to a very great extent a matter of conjecture. It is certain that asphyxia or suspended animation and death result when air containing from eight to ten per cent of carbonic acid is breathed. Dr. Griscom, in his book on *The Uses and Abuses of Air*, says, "When it contains above one half per cent of carbonic acid, it may not be immediately, or rather palpably, injurious to the organism, but it is eventually so." Professor Huxley says, that "uneasiness and headache arise when *less than one per cent* of the oxygen of the air is replaced by other matters. As 10,000 parts of the atmosphere contain 2100 parts of oxygen, *less than one per cent* of the oxygen would be only about 2 parts in 1000 of the air. If, therefore, it is charged with carbonic acid, or other impurities, and deprived of oxygen to the extent of *one fifth of one per cent* of its volume, uneasiness and headache arise." From the same authority we learn that, "When air is vitiated from animal sources with carbonic acid to more than 1 per 1000, the concomitant impurities become appreciable to the nose." It seems probable that *any* degree of impurity in the air, or any reduction of the quantity of oxygen, is injurious, although the effects of breathing it may not be at once perceptible. In our food we allow no suspicion of poison, and it is equally important that the air we breathe should be without any unwholesome element. Whenever, therefore, we are able to detect impurity by the test with which nature has provided us, it is obvious that the air should be changed and the impurity expelled. Knowing, as we do, very nearly the quantity of oxygen consumed and the carbonic acid exhaled by an ordinary person in twenty-four hours, a simple calculation will determine how much air will thus be vitiated. If 350 cubic feet are passed through the lungs of each person in twenty-four hours, taking the amount of carbonic acid in the atmosphere at 3 parts, and expired air at 470 parts in 10,000, then an ordinary person would vitiate 23,500 feet of air per diem to the extent of 1 per 1000. Add to this the excretions from the skin, and we will have a total of about 24,000 cubic feet of air per day, or 1000 cubic feet per hour, required by each person. Therefore a car occupied by 60 passengers should be supplied with 1000 cubic feet of air per minute in order to be kept so pure that its odor can not be observed. If no fresh air is supplied from the outside, that contained in the car will become unfit to be breathed in three minutes, uneasiness and headache will be caused in six minutes, and death would ensue in five or six hours.

To ventilate an ordinary 60-seat passenger-car *thoroughly*, we must, therefore, be able to supply it with 1000 cubic feet of fresh air every minute. To do this, means must be provided by which this amount of air can *enter* the car. Surprising as it may seem, this provision is hardly ever made. Most of the cars are supplied with ventilators by which the foul air can escape, but very few have any provision whatever, excepting those which are accidental, for admitting fresh air. All that enters comes in through the crevices and open windows and doors. From this cause it frequently happens that the best built cars are the worst ventilated. Double windows, or those which are well-fitted, will admit very little air. It is often supposed that the opening and closing of the doors will admit of sufficient fresh air at all times. This idea is common not only among persons who have never thought on this or perhaps any other subject, but we have known master mechanics and car-builders who have the entire charge of building and designing cars on long lines of road to assert, in the most imperious way that no other provision was necessary. A few moments' consideration will show how absurd such a notion must be. If a door was opened once every minute in order to ventilate the car thoroughly, then 1000 cubic feet of air must rush into it while it is opened. Ordinarily a door is open less than three seconds, and on through-trains—at night especially—probably they are not opened once in five or ten minutes, so that 5000 or 10,000 cubic feet of air must rush into the car whenever the conductor passes from one to the other. With the thermometer below the freezing-point and a red-hot stove inside, if this were the case, the transition from heat to cold would be any thing but agreeable or endurable. It must also be remembered that if the quantity of air enters the car, the same amount must go out, either through the ventilators or by some other opening. That 5000 or 10,000 cubic feet of air will rush out of the ventilators of a car in three seconds is simply absurd, especially when the car is standing still; and when they are all closed, it would be more difficult to tell how the air does escape than it is to know what a gopher does with the material he excavates for his subterranean residence. There is no reason for thinking that any quantity of air, or any quantity which is at all adequate to supply sixty people with oxygen, enters through the car-doors in the few seconds during which they are usually open. On any train the car-doors are opened at very irregular intervals, and as we have shown that when a car is full of people in three minutes the air becomes odorate, and in six entirely unfit to be breathed, therefore, even if any considerable quantity did enter at the doors, there would be too many intervals when they are closed, during which all the air would become unwholesome, so that it would be necessary to remove the whole of it as soon as the door was opened, if fresh air is supplied from that source. Any one giving the subject a few moments' intelligent reflection or calculation will be obliged to abandon the idea of ventilating, or rather of supplying fresh air to a car from the doors.

The important question then arises, *Where* shall the fresh air be admitted? Unless ample provision is made to allow it to enter, thorough ventilation will be impossible. There is very little difficulty in *removing* the air, if an abundant *supply* is furnished. If, for example, when a car is in motion, the front door and ventilators in the roof be opened, then, if the wind is not very unfavorable, an abundant supply of fresh air will rush in through the door, and that which filled the car will pass out at the ventilators. If the latter be closed and a window be opened, there will be a strong current outward through the window so long as the front door is open, and, as we said, the wind is not very unfavorable. But the minute the door is closed, there will be very little, if any, outward current through the windows. If, however, the door is kept open in cold weather, the passengers in the immediate vicinity, and, in fact, to a greater or lesser extent all those in the car, will be subjected to great discomfort from the current of cold air which enters; therefore the first impulse of most people when the door is left open, if the temperature is anywhere near freezing, is to close it. If now, instead of the door, we make any other aperture to admit cold air, the same difficulty will be encountered. If it enters at the floor, it will remain there in a cold stratum, causing cold feet. If it is admitted at the top of the car, it will fall to the floor, on account of its greater specific gravity. If openings are made overhead, in the sides of the car and immediately under the roof, as is often done to admit fresh air, it will descend in a stream like a cascade, producing that disagreeable cold sensation about the neck and head which is so frequently experienced in cars, especially at night. It is impossible to introduce cold air into *any part* of a car which is filled with people *without being a cause of discomfort to them.*

If, instead of opening the front door, we open the window immediately in front of the front stove, (supposing the car to be warmed with two stoves, one at each end, and close the blind inside, if the wind is not very un-

favorable, a current of air will enter through the window and between the slats of the blind, and will thus receive an upward direction as it enters. It will thus pass over the stove, and to a greater or lesser extent be warmed, and then pass over the heads of the passengers, so that no draught or cold air will be felt by them, (if this front window and a ventilator, or, what is perhaps better, the corresponding window at the back end, is opened, a car in most cases can then be thoroughly and comfortably ventilated,) thus showing, conclusively, that while the introduction of cold air is a cause of discomfort, and consequently impracticable, that warm air can be supplied without being in any way unpleasant. We are, therefore, brought to the conclusion that *to ventilate a car in cold weather, it must be supplied with* WARMED AIR. This conclusion, we know, has been questioned; but those who oppose it must show how 1000 cubic feet, or half that quantity of air, with a temperature below freezing, can be introduced into a car each minute, without serious discomfort to the passengers, before they can make it clear how a car can be both warmed and ventilated, in cold weather, on their plan.—*Chicago Railroad Gazette.*

The Union Pacific Railway Shops.

THE Union Pacific railway shops are located in Omaha, Nebraska. The principal shops and storehouses are built of brick, in the most substantial form, and, with the out-buildings, lumber-yard, tracks, etc., cover about 30 acres of ground. The master mechanic of the road is I. H. Congden.

THE ROUND HOUSE.

This building is one and a half stories high, of brick, with the exception of five stalls, which were the first put up for the road and are built of wood. The building contains twenty stalls in all, and is under the charge of James McConnell, master mechanic of the Omaha shops.

MACHINE SHOP.

This is built with very strong walls, and is 60 × 120 feet in size. It is furnished with all the new and most improved machinery which is necessary for the successful working at all the branches of car and locomotive repairs or car construction. Among the machines may be seen lathes for turning driving-wheels, two boring-mills for boring car-wheels, and one hydraulic press, used for pressing car-wheels on their axles.

At one time, this shop presented a lively scene—when 850 sinewy men were busily engaged in manufacturing and repairing cars. All this body of men were then connected with the locomotive department, and could no more than keep that department of the road in repairs. No other shops on the line were then in working order, excepting that at North-Platte. Now, the force is reduced, as the company are abundantly supplied with cars for the present trade, and the men are scattered along the line, forming the working force of other shops, of which there are many. But during this great rush, they were congregated here, and the machinery was run day and night. As many as eleven locomotives were on the stalls under repairs at one time; besides that, they were turning out three freight-cars per day, one passenger-car per month and one baggage-car per week. During this time, they also supplied the contractors along the line with needed material which is usually manufactured at the company shops. The whole road, in fact, with the exception of North-Platte station, drew its supplies from this shop. At the present time, about 350 men are employed in the locomotive department; but as freight increases and the want of more cars is felt, the force will be increased to meet the demand.

THE FOUNDRY.

The foundry is a very fine structure, and during the winter of 1868–9, 150 men were employed there. About sixteen tons of castings per day were turned out, consisting, mostly, of columns and pillars for the new shops building along the line. The hotels in course of construction for the company, at the different eating stations, were large receivers of lighter columns and pillars—nearly every hotel being built, in part, of iron.

BLACKSMITH-SHOP.

This building is 80 × 200 feet, one story and a half high, well ventilated, and supplied with 40 forges, which, during the driving time spoken of, were all employed, 144 men being at work about the shop and around the 40 fires. There are no shops superior to this, and not many equal to it, on our oldest railroads. The forges are a curiosity in their way, all of them having been cast, at the company's foundry, after a design by Mr. Congden. About 80 men are now employed in the shop, only part of the fires being used at present.

THE STORE-ROOMS.

This building is 76 × 80 feet, one and a half stories high, built with very heavy walls. When we visited it, we saw stored therein 800 tons of bar-iron, 800 tons sheet and boiler-iron, 100 tons of bolts, nuts, and rivets, enough, one would imagine, to bolt and nut all the lines of road which are deficient in fish-plates. Yet all this weight of from 1700 to 3000 tons—for we have spoken of only a portion of the stock—disappears with marvelous rapidity beneath the ponderous sledge and ringing hammer, to reappear in the various forms and guises in which it is needed in repairs or further construction of side tracks and turnouts. Fish-plates, plow-points, bars, picks, bolts, bands, etc., lie around in piles, interspersed with shafting, car-wheels, axles, cranks, pipes, columns, and many other articles too numerous to mention, piled in separate stacks, with walks between, the whole forming, to the uninitiated, a perfect labyrinth of lanes, which lead only to some new mystification, or, worse still, a chaotic mass of iron in all stages of manufacture.

CAR AND PAINT-SHOPS.

The car-shop is 75 × 150 feet, one and a half stories high, with a wing 40 × 100 feet. The paint-shop, which might be said to be connected with the car-shop, is 30 × 121 feet. Thirty men are employed in this shop now; but this number can be increased to sixty, as the exigencies of the times may require.

In the car-shop 70 men are now employed, though during hurrying times as many as 300 have been at work there at one time. The capacity of the shop is four box-cars per day, one coach per month, two second-class passenger-cars or two mail-cars during the same period.

The lumber-yard, wherein is stored the lumber, is capable of containing five and a half million feet. The lumber used in constructing the cars is mostly oak and ash, obtained in Northern Indiana, Wisconsin, and Michigan. In point of neatness of finish, strength of build and size, the passenger-cars manufactured here are unsurpassed by any, and rivaled by few manufactured elsewhere. No part of the car is slighted; and when they are finished, reflect credit on the master car-builder, George E. Stevens, and on the company, who so liberally provide for the ease and comfort of the passengers who patronize their road. At one time 900 men were employed in this department; but as the company became better supplied, they reduced the force until only about 350 men are employed.

The painting on these magnificent carriages is equal to any we have seen elsewhere. It is the expressed determination of the Union Pacific company to provide as good cars and coaches for the traveling public, in style and finish, as those of any Eastern road. They reason that, as the great trans-continental railroad is the longest and grandest on the continent, its rolling stock should be equally grand and magnificent. From the appearance of the cars already manufactured, they will achieve their desires.

STATIONARY ENGINE, WATER-TANK, ETC.

The engine which furnishes the power necessary to drive the vast amount of machinery in these shops is of 70 horse-power, and is a model of symmetry and finish. It was hauled to its present place in wagons from Des Moines, Iowa. The engine-house is flanked by the transfer-tables, by which cars are moved from stall to stall, or from shop to shop. A large water-tank, capable of holding many thousand gallons, is another feature of the establishment. In fact, it would be very difficult for the most zealous fault-finder to find scope for his amiable qualities while wandering around the company's shops at Omaha. Here also are manufactured the "Stevens Truck," invented by Car-master Stevens. These trucks are of new design, calculated for all kinds of cars, and are fast superseding those now in use. They have been placed under the Pullman car in many instances, and give perfect satisfaction.—*Transcontinental Guide.*

Car-Wheels and Axles.

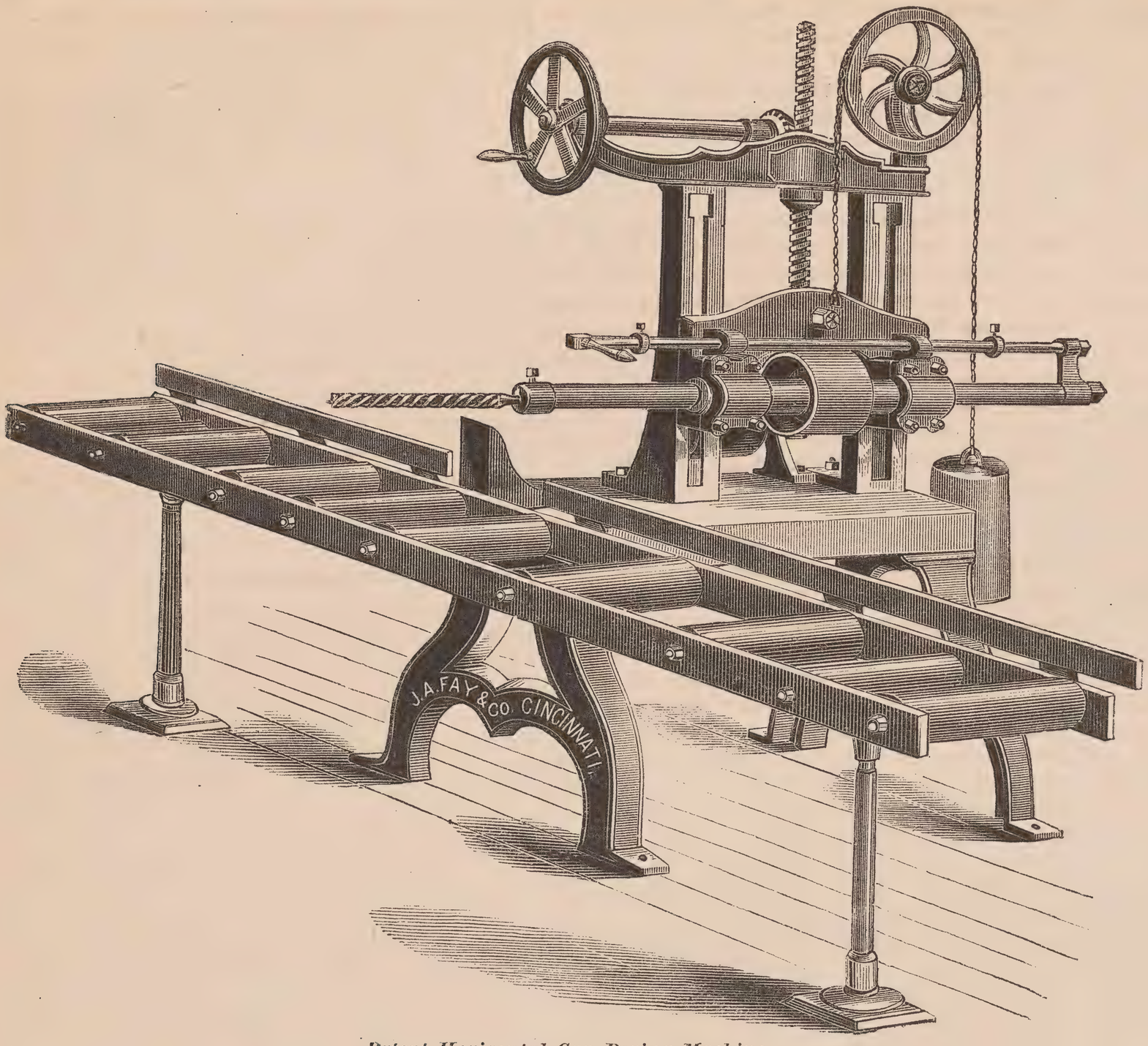
A CORRESPONDENT of the Boston *Advertiser* writes, "Accidents from the breaking of axles, wheels, and rails, especially during the cold weather, are becoming alarmingly frequent. Scarcely a week passes that we do not read accounts of disasters from these causes, notwithstanding the vigilance of railroad managers. No confidence is felt by railroad men in the common rigid wheel, and no well-managed road allows them to run more than fifty or seventy-five miles without being thoroughly inspected. It is no uncommon thing to find a new wheel cracked after the first fifty miles. The man or men who will give us a remedy for these evils will confer a blessing upon the traveling public, the value of which can not be computed. The crystallization of the axle by the continual jar of the rigid wheel, coupled with the effect of low temperature, is a fruitful cause of these breakages."

Another correspondent calls attention to the manner in which axles are bought:

"The buying road perhaps stipulates for best scrap axles—and what does that mean? Hoops and sheet-iron are prohibited in best scrap-iron, to be sure; but the separate pieces are as dissimilar in character and temper as if composed of different metals. A soft horse-shoe, with hard steel calks upon it, lies next to an old wagon-tire, brittle from the rumble of years, and a bolt, a bar, a pin, a bit, and a worn-out shovel or scythe, all go to make up the pile that is expected to stick together with a little heat. A large part of such a mass never was, perhaps, any thing but common iron, and the rest has lived and outlived its appointed days, and is ruined by the service. To heat such iron to a welding heat will seemingly improve it a little. It but little more than anneals it, and the benefit is temporary. The little new life breathed into a mass of old wrought scrap-iron, by the present process of working, is never permanent; it amounts to nothing, in fact, but a means often of allowing innocent and ignorant persons the means of deceiving themselves."

According to this correspondent, "The scrap-iron of thirty years ago was good, while that of the present day is very bad. The comparative freedom from accidents attended with loss of life is attributed to the fact that the strain upon axles is not ordinarily great, and that even a very poor axle may run for a long time without showing a defect. Even an axle of wood, carefully selected, might run for years, and be infinitely safer, with the thermometer below zero, than rotten iron."

Chambers's Journal gives this illustration of the power of India-rubber to deaden sound: "We once visited a factory where some forty or fifty coppersmiths were at work in a shop above our heads; but, what was remarkable, scarcely a sound of their noisy hammering could be heard. On going up-stairs, we saw the explanation. Each leg of every bench rested on a cushion made of India-rubber cuttings. This completely deadened the sound."



Patent Horizontal Car-Boring Machine.

THE engraving illustrates the new *Horizontal Car-Boring Machine* manufactured by Messrs. J. A. Fay & Co., Cincinnati, Ohio, who are extensively engaged in the building of wood-working machinery. Our readers will doubtless be interested in the following description of the above-named machine, which we copy from the manufacturers' circular: "It is intended for general framing purposes, more particularly for car and other railroad work, including bridge and truss framing, and has no superior. It is built from entirely new and original designs, and in the most heavy and substantial manner. It is constructed wholly of iron and steel, including the table, the rails of which are wrought bars. The timber rests on rolls and is always on the same plane, the boring-head and bit being arranged to adjust vertically without altering the belt tension.

"The spindle is steel, 1¾ inches in diameter, and has a movement of 17 inches; is bored to receive a ¾-inch shank, and is provided with a steel bush to reduce the chuck to ½ inch for smaller bits.

"The head is counterbalanced by a weight, and is quickly adjusted by a hand-wheel, and screw of coarse pitch. By this means of adjustment, the bit is brought to a point with accuracy and with the greatest ease. No friction-clutches or other perishable devices are used, *all the machinery is above the platen—therefore, free from chips.* The whole running parts consist of the spindle and two idle pulleys, which run on steel taper bearings, fitted in gun-metal boxes.

All parts are planed together, and made in the most durable and workmanlike manner. The machine is driven from over-head by a 16-inch pulley, running at the rate of 500 revolutions per minute. Weight of machine, about 1400 pounds."

We are informed that these machines are being extensively introduced, and wherever used have given entire satisfaction. Further particulars may be obtained from the manufacturers, to whose advertisement we refer, on the third page of cover.

Pullman Palace Parlor-Car.

THE *Chicago Railway Review* contains the following account of one of the recent productions of the Pullman car-shops:

"The car is 58 feet in length, and of the usual dimensions otherwise; twelve-wheel; having, of course, the Miller platform and the Baker heater, with approved brakes and ventilator, and supplied with all those 'modern conveniences' which have come to be regarded as simply matter of course on all the cars of this company. We shall describe the car more in detail than has been our custom, because it has not been our fortune to have seen one whose unity and symmetry of design, and fitness of detail throughout so emphatically gratifies the artistic taste. At each end is a smoking-room 9 feet 8 inches square. Going toward the middle of the car from one of these, you pass through two state-rooms, 6 feet 4 inches by 7 feet, (separated from each other by a heavy drapery instead of a door;) or a passage-way along the side, 3 feet in width, also leads you to the public parlor in the middle of the car, 18 feet 8 inches in length by 9 feet 8 inches in width. From the smoking-room of the other end, you enter this parlor by a 3-foot passage-way, on one side of which are wash-room, toilet-stand, and water-closet; on the other, two compartments, one containing Baker heater (wholly shut off from the interior of the car) and the other serving for a baggage-room. No description can give an adequate impression either of the general effect or of the details which we sketch.

"The smoking-rooms have 6 windows each, 2 at each side, and 2 at end on either side the door. These are 26 by 39 inches French plate. They are each provided with 6 chairs. The covering of the chairs, as also the *lambrequins,* is of Turkish morocco, Bismarck colored. The curtains are of silk of the same shade throughout the entire car, harmonizing both with the finish of the interior and the exterior. These rooms are finished in black-walnut, with French black-walnut veneers.

"The state-rooms are finished in black-walnut, relieved with veneer of light *amboine.* The chairs (2) and sofa are covered with bronze (Havana) colored plush, the seat edges being covered with green plush; *lambrequins* of the same material. They have two windows, 21 inches wide by 39 in height.

"The parlor has 10 chairs and 2 sofas, together with ottomans, etc. The finish is black-walnut, with dark *amboine* veneer. It has 10 windows, (21 by 39 inches,) 8 in sets of 2, with mirrors between, 25 by 35 inches. The upholstery is the same as that of the state-rooms. The seats are not only the most elegant, but the most comfortable for a long ride that we have yet seen. The chairs are very heavy indeed, with seats 2 by 2 feet; the sofas have seats 18 inches wide, the back sloping to 2 feet, and the angles are all studied with reference to perfect ease. One is struck, in passing through the car from room to room, with the general effect, which is that of spaciousness, and of a unity and simplicity of design in which all the details however ornate, perfectly harmonize. In one word, the *architectural* effect is thoroughly good. The 'effect' of the parlor, when the doors are closed, is that of a well-designed apartment in a private house. The lines—of cornice, tracery, etc.—are preserved entirely around the room. Every 'expectation' of the most artistic eye is met; there is no break, no disappointment anywhere. We ought, especially to notice the head-linings, as conducing to the general effect. Few are probably aware of the amount of taste and skill, to say nothing of *money,* ($500 per car,) expended on these. They are, in fact, works of art—being of heavy canvas, prepared precisely as if for a painting in oil; the design traced (after pattern) by a mathematical draughtsman; and the colors (oil) put on by skilled hands. They are uniform throughout the car the ground-work being of light purple and bronze. One of the most noticeable features is the harmony between the interior and the exterior; the Bismarck silk curtains harmonizing not only with the former, but with the olive (greenish or brown, according to the light) of the exterior.

"Of these parlor-cars, the company will soon have 12, of which 4 are building at Aurora, and 4 at Detroit. The 2 just built, and which may be seen this week on the track at the Union Depot, were built at Taunton, Mass. Five of these cars will constitute a daily line between Chicago and Suspension Bridge, *via* Michigan Central and Great Western railways; and a daily line will be placed on the route between Boston and Saratoga."

Missouri, Kansas, and Texas Railroad.

H. D. MIRRICK, General Freight and Ticket Agent of the road, was in the city lately. We learn from him that the road now has on its two divisions 339 miles laid, upon which cars are running—180 from Junction City, on the Kansas Pacific, to Chetopa, and 159 on the division from Sedalia to the line from Junction City, about 40 miles below Fort Scott. In the Indian Nation 70 miles are graded, and thei ron is "on the water" for this. This will place the terminus within 14 miles of Fort Gibson, on the Arkansas River, over which a bridge will be at once built. Cars will be running to Chetopa by the 15th of February, and to Fort Gibson by May 1st. Thence the road will be pushed forward to Galveston, with the greatest possible speed.

MR. WILLIAM S. TOWNE, master car-builder of the Hudson River Railroad, has resigned, and John McKenna, formerly foreman, has been appointed in his place.

The National Car-Builder,

PUBLISHED MONTHLY,

BY

VOSE, DINSMORE & CO.,

1 BARCLAY STREET, NEW-YORK,

AND

15 LA SALLE STREET, CHICAGO.

Terms, 50 cents per Annum.

Editorial Announcements.

CORRESPONDENCE.—*We cordially invite the coöperation of the railroad public in affording us the material for a good mechanical paper. Articles relating to rolling stock and machinery, by those practically acquainted with those subjects, will be gratefully received. All communications must be addressed to Vose, Dinsmore & Co., No.* 1 *Barclay Street.*

The name and address of the writer must accompany all communications designed for publication.

ADVERTISING RATES.—*For one square, or one fifth of a column,* $5 *per month, or* $50 *a year. For half a square,* $3 *per month, or* $25 *a year. Larger advertisements by special contract.*

All communications in regard to advertising should be addressed to L. F. DINSMORE, *Post-Office Box* 4055, *New-York City, who is our agent for advertising, and authorized to make contracts, collections, etc.*

ENGRAVINGS AND ILLUSTRATIONS.

We would invite the attention of Master Car-Builders and others to the advantages to be derived from publishing in THE NATIONAL CAR-BUILDER *engravings designed to illustrate the various features and details of car construction, and especially such improvements as can not otherwise be clearly presented. We will procure cuts to be made in the best manner from drawings or models that may be sent us, and charge only for the cost of engraving, inserting the same in our paper with suitable descriptive details, without charge. The cuts thus made by us, or that may be sent us for use in* THE NATIONAL CAR-BUILDER, *will of course be returned promptly to the owner.*

Remediable Discomforts of Railroad Cars.

LIFE, if it teach no other lesson, at any rate always impresses the fact on those who live, that some things can be done and others can not; and it is a mark of wisdom when men discriminate quickly between the things which are possible and those which are not. That travel implies more or less discomfort, all who leave home very soon learn; but while some accept the inevitable cheerfully, others never cease grumbling from the time they buy their ticket until they finish their journey. Such too is the inherent dissatisfaction of human nature, that the improvements of modern times do not seem to have allayed its discontent. The truth is, however, that the mitigation of one evil only reveals another. A pedestrian with tight boots is very apt to think that the one thing which makes life desirable is to be comfortably shod; but be his shoes ever so easy, the measured stride up hill and down, over rough roads and smooth, soon results in aching limbs and unelastic muscles, notwithstanding the exhilarating influence of fresh air. A horseback ride then presents to the imagination a picture of felicity, which in time he also finds delusive; and then a carriage or stage-coach seems like a very cradle of ease, and a railroad car a temple of tranquillity. Alas for this dream! It is soon learned that our physical frame is constructed with a spinal column, and that our heads are more affected by sharp angles than our brains are with sharp thoughts. We also learn what perhaps we were before ignorant of, that our buoyant spirits and our amiable tempers, which we flattered ourselves were a voluntary production of our inner consciousness, are in great measure dependent upon a sufficient supply of oxygen, and that our disposition will not bear being shut up hermetically and deprived of fresh air. We become irritable, despondent, forget our usual politeness to strangers, become insolent to the conductor, and satisfied that he has that day stolen from the railroad company part of the fares collected. Our neighbor in the adjoining seat we suspect of being a pickpocket, and we wonder how the woman in front *could* be such a fool as to wear so much false hair. To all this infelicity we will be charitable. It is one of the "remediable" evils to which we referred. It is simply a want of fresh air. Your feelings are caused by breathing poison, and your brain is starved in being deprived of oxygen. This scientific truth is worth treasuring up, because it is not only in the physical effects that impure air works evil, but the moral influence of a pure atmosphere is much greater than most people suppose. We have no intention of attributing moral conduct, which should be and is a matter of volition, to material causes; but the reader may be sure that it will require much more effort to restrain him or herself from doing and saying foolish things when they breathe foul air, than when they are inhaling nature's great tonic in all the purity in which she administers it.

We wish it were possible for us to write some words on this subject, so impressive that no conductor or brakeman who reads them could ever forget the lesson; because it is in *their* power nearly always to remedy the evil we have tried to describe. We will, however, make one request. Whenever you find the passengers on your train grow more than usually irritable, see that the ventilators are opened, and at all times, if you want to keep them in good spirits, give them an abundant supply of fresh air.

The subject of air naturally calls to mind the windows of cars. Now, if any person in view of the truth which we have endeavored to impress on their minds, undertakes to admit fresh air by the window of an ordinary car, they will find that in nine cases out of ten there is no provision for holding it up, excepting at the top of its "run." If you feel disposed to have it open only an inch or two, there is usually no provision for keeping it there. Car-builders seem to have an uncompromising idea that, if a window is open, it should be open as much as possible; and if is not up all the way, it should be closed entirely. Now, it often happens when the car is too warm, that it would be refreshing to admit a small quantity of air, whereas a large amount at that time might be unpleasant either to the person next the window, or to those in the immediate vicinity. The attention of car-builders is called to this evil, so easily remedied. Usually a few hours' time and a good brace and bit would accomplish the whole thing. We would recommend people who travel to carry with them a short piece of wood for the especial purpose of holding up windows. What is better, is a piece of thin board about three or four inches wide, and six or eight inches long. This can be put under the window sash, and if allowed to project outside, will create either an inward or outward current of air, according to the position in which it is placed. It is surprising that this idea has not been made use of, and some permanent appliance embodying it adapted to car-windows. There is an inviting and fertile field here for the exercise of ingenuity.

In the form and proportion of seats, much improvement could be made. One great evil is, that nearly all seats are made too narrow, that is, measuring from the back to the front. They should be at least eighteen inches wide, or perhaps twenty or twenty-two inches would be better. The distance from the centre of one seat to that of another should not be less than thirty-six inches to afford room for reasonable comfort. Less than this will crowd full-sized people.

In the upholstery of seats there is also room for improvement. The present system of endeavoring to make the cushions as *convex* as possible seems to be radically wrong. Any one who will recall the seats in stage-coaches, will remember that they were almost always made to *incline* backward. The jolting thus had a tendency to settle a passenger *into* his seat instead of sliding him off it, as it does now in a car. Of course where the seats are reversed, as they are on American railroads, this inclination is not practicable, but very much the same effect would be accomplished if the seats, instead of being stuffed *convex*, were made *concave*. To be comfortable, there should of course be the same amount of elasticity in the cushion if made in this form as if it were made convex.

One other evil which is very common is, that all the mouldings around the windows against which it is possible for a passenger to rest his head or his arms are made square and sharp. They could just as easily, and with hardly any additional expense, be made round or curved, so as not to present rigid lines and angles to the body.

Another evil of which we will speak, although it is doubtful if this is remediable, is what Anthony Trollope, when he visited this country, called the "abomination of expectoration." To reform the manners of a people is perhaps more difficult than to reform their morals; therefore we have no expectation that this habit, the recollection of which is nauseating, can be entirely checked. Would it not be practicable, however, in every car intended for the occupation of ladies, to modify the usual notice of "no smoking" by adding to it "nor expectoration," and to enforce the injunction? We recommend this subject to the woman's rights people. It is one of their real wrongs, of which they have a right to complain.

Erie Railway Passenger Coaches.

OUR December number contained a description of two new coaches then just completed at the Jersey City car-shops of the Erie Railway Company, under the superintendence of Mr. C. A. Smith. Since then, two others of the same class, named "Col. James Fisk, Jr.," and "Jay Gould," have been finished. A correspondent of the *Evening Mail* gives the following description of the last-named car:

"The 'Jay Gould' is 56 feet by 11 feet; will seat fifty-six passengers; is lighted by Gunster's gas-machine; heated with Baker, Smith & Co.'s patent car steam-heating apparatus, with pipes under each seat and sofa; has two water-closets, two wash-rooms in white marble, black-walnut, maple, rosewood, and gilt; a ladies' lavatory, ice-water tanks and attachments, five reflecting gasoliers suspended from the ceiling, trimmed with silver, by George H. Keitching & Co., costing $4500. The interior of the car is trimmed with silver wherever metal is used, including arms, hinges, rails, knobs, hat-racks, clothes-hooks, brackets, window-fastenings, door-slides, etc., by Newman & Capron, of New-York.

"The bridal chamber has velvet Brussels carpet; the furniture is covered with drab medallions of crimson, scarlet, white, and rose colors; drab silk curtains, intermixed with blue and gold, bought of Stewart; sofa beds with easy pillows and bolsters, chairs on revolving hinges; beds with improved spiral steel spring mattresses, covered with crimson reps; beds raised by automatic or spiral springs, so complete that a child can raise or lower them. The ceilings were frescoed by Sebastian Brodt.

"The car is trimmed with French moquet, and green, drab, and gold crimson are the prevailing colors. The windows are of the best French plate-glass—one large or centre one and two smaller or movable ones—the whole of etched glass by Downing, and in all the panels is the Goddess of Music, with lyre etched in the glass. The wood used is black-walnut, ashburis, black-walnut panels, and rosewood mouldings, inlaid with gold, the two former coming from the West. There is a mirror in each door and panel. The seats are peculiarly adapted for ease and comfort, being upholstered at the ends, back, and extra or lounging back with French moquet of green drab, crimson and gold. The cushions are on the best of steel spiral springs and are adjustable; arms silvered.

April 1871

The upper berths are self-acting. The busts of Mr. Gould inside are carved of white holly, the Erie Company doing all the carving of the car at a cost of $4000 each. The portraits in oil of Mr. Gould on each side of the outside of the cars will attract much attention. The oil paintings in the inside or frescoed panels are representations of scenery along the line of the Erie Railway. Chairs are hung with silver slip-joint hinges. The ventilation is very complete and is formed by wire screens in the roof over each platform, and from this point is conducted through the car, being increased or lessened by the use of beautiful glass paneled swivel ventilators in the roof of the car. The wire screens prevent cinders from going in. The electric or magnetic brake is used; Miller's platform buffer and bumper; six-wheel trucks with steel tires on wheels, the steel and iron being cast solid together; eight guard-chains from trucks to car-body, and elliptic and rubber springs combined. The several departments of the company's work-shops are so complete that these cars in all their elegance are made therein, embracing cabinet work, upholstering, painting, gilding, body, trucks, etc. The 'Jay Gould' weighs but twenty five and one-half tons on a wide track, whereas a Pullman narrow-gauge car weighs twenty-eight to thirty tons. Commerce, railroads, and shipping are represented on the outside corners of the car. None but the best selected timber was used. Mr. Gould gives a personal supervision over the work-shops and employees in the construction of these and other cars. The style and finish of the 'Col. James Fisk, Jr.,' is very similar to the 'Jay Gould,' except that the colonel is represented on the outside corners by four members of his staff. The cost of each car is about $35,000."

New Publications.

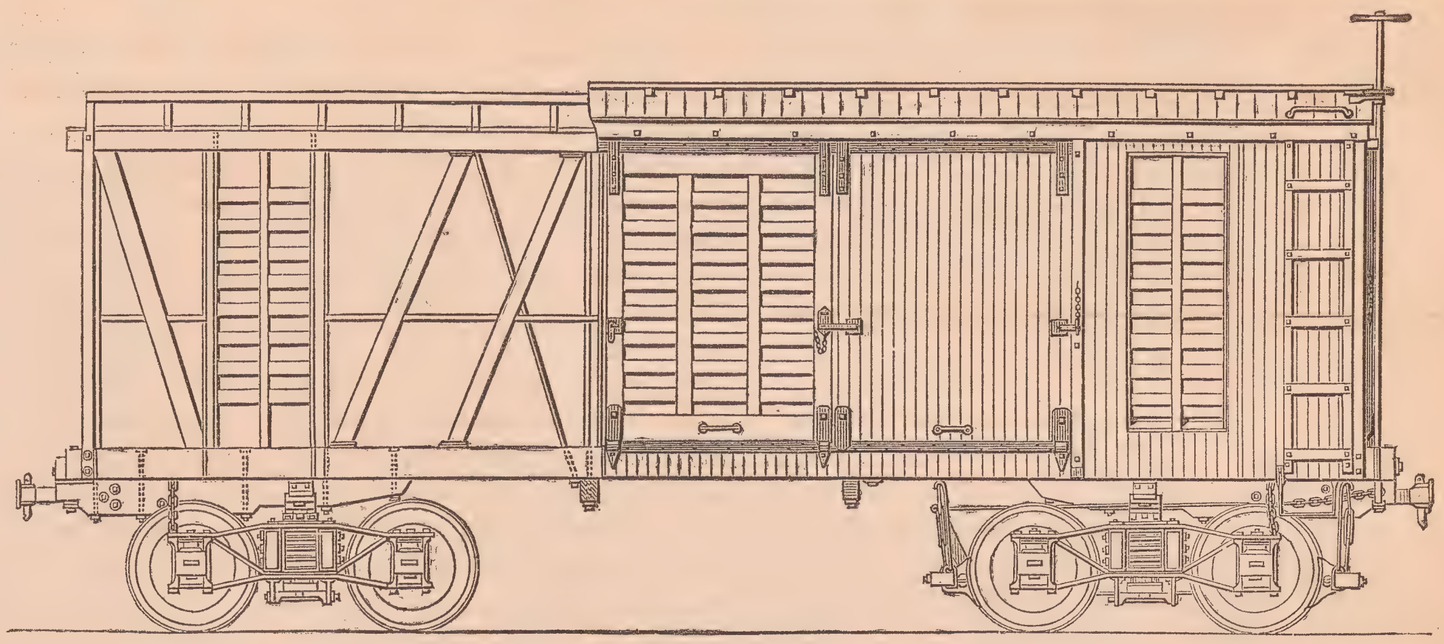
THE TRAVELER'S OFFICIAL RAILWAY GUIDE, Philadelphia.—The March number of this publication sustains the high reputation it has won as a standard guide for travelers, and a reliable manual of reference. Its pages contain a complete list of time-tables with the latest corrections, and also a great variety of general railroad information, including the names and address of officers of the various lines, editorial and selected matter, maps and illustrations, and a copious index.

THE PENN MONTHLY, published by Porter & Coates, Philadelphia.—This periodical, now in the second year of its existence, is conducted by graduates of the Pennsylvania University, and devoted to the discussion of the leading social, political, and literary topics of the day. Its articles are elaborate, thoughtful, and suggestive; and while they evince the research and scholarship which render them acceptable to the more cultivated class of readers, they are none the less suited to popular appreciation. The style is lucid and clear, the typography faultless, and all who are interested in the serious discussion of the important problems of political and social economy will find in the pages of this magazine essays that are edifying, instructive, and of permanent value. Price, $2.50 per annum.

THE GOLDEN AGE, a weekly journal recently started, and conducted by Theodore Tilton, discusses every topic of current interest, religious, social, literary, political, and industrial, with that peculiar earnestness and spirit characteristic of its editor.

WE refer to the advertisement of "Bailey's Patent Adjustable Planes." These planes received the first premium of a silver medal, awarded by the Auburn Industrial Association, at its recent exhibition at Auburn, N. Y.

MR. STANLEY G. FOWLER, in consequence of impaired health, has retired from the editorial department of *The Chicago Railway Review*, having transferred his interest in that paper to his former partner, Mr. D. C. Brooks.



Hannibal and St. Joseph Railroad Combination Freight-Car.

THE engravings represent side and end views of a combination freight-car, built by the Hannibal and St. Joseph Railroad Company, at Hannibal, Missouri, and adapted to the transportation of various kinds of freight, including merchandise, lumber, livestock, and produce. The outside dimensions of the body of the car are, 8 ft. 8 ins. wide, 28 ft. 4 ins. long, and 8 ft. 7½ ins. high. The inside is 7 ft. 10½ ins. wide, 27 ft. 6½ ins. long, and 7 ft. 3½ ins. high. It rests upon double iron transoms, and the improved centre-bearing, swing-beam trucks. The centre of the draw-bar is 2 ft. 8 ins. from top of track. It has the Winslow patent iron roof, Martin's patent grain shutters and slat and tight doors, and can be readily changed from a stock-car, with openings equal to 124 square feet, to a tight box-car, for merchandise or bulk grain.

The principal timbers in the car are as follows:

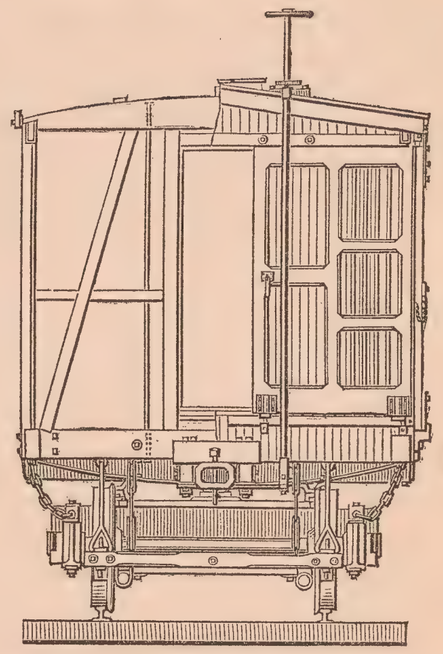
Two side-sills, 4½ × 8—29 ft.
Four intermediate sills, 4½ × 8—27 ft. 5 ins.
Two end-sills, 6 × 8—8 ft.
Two truss-timbers, 5 × 6—8 ft. 6 ins.
Two side-plates, 3 × 6½—29 ft.
Two end-plates, 3 × 8½—8 ft. 10 ins.
Fifteen carlings, 2⅜ × 3½—8 ft. 10 ins.
Two facia strips, 1⅛ × 4¾—28 ft. 6 ins.
One ridge-pole, 3 × 3—28 ft. 6 ins.
Four corner-posts, 4 × 4—7 ft. 8 ins.
Four side door-posts, 3 × 4⅞—7 ft. 8 ins.
Four end door-posts, 3 × 8—6 ft. 11 ins.
Eight intermediate posts, 3 × 4—7 ft. 8 ins.
Four intermediate posts, 2 × 3—6 ft. 9 ins.
Eight side-braces, 3 × 4—7 ft. 2 ins.
Four side-braces, 2 × 6—7 ft.
Four end-braces, 3 × 3—7 ft. 2 ins.
Four drawbar-timbers, 4 × 9—8 ft.
Two deadwood blocks, 7 × 6¼—2 ft.
Two girders for brake-hangers, 4 × 8—2 ft. 3 ins.
Four truck-timbers, 5 × 13—7 ft. 2 ins.
Two swing-beams, 10 × 10—4 ft. 11 ins.
Two swing-planks, 3¼ × 10—4 ft. 11 ins.
Two brake-beams, 4 × 7—5 ft. 10 ins.
Two ribs, 1 × 3—28 ft. 6 in.
Floor, 1¾ inches thick.

The following are the principal irons:

Transoms, ⅞ × 6.
Arch-bars of truck, 1 × 3¼.
Bottom strap of truck, ⅝ × 3¼.
Drawbar stem, 1¾ round iron.
Wrought-iron bunter-followers, 1 inch thick.
Bunter-straps, 1 × 3½.
Swing-beam hanger, 1¼ square iron.
Door-slides, ⅝ × 2¼.

The body has—

Four ¾-inch brace-rods.
Sixteen ⅝-inch perpendicular rods.
Four ¾-inch perpendicular rods.
Bolster springs, 6 × 9 rubber.
Journal springs, 2 × 6 rubber.
Buffer springs, 6¼ × 6½ volute.



The Winslow roof is made of 16 sheets, 19½ × 11 in. No. 22 best charcoal iron.

The axles are 6 ft. 9¼ in. long; journal, 3¼ in. diameter by 6⅛ in. long; diameter of wheel-seat, 4⅜ in.; of centre of axle, 3¾ inches.

Whole weight of car, 19,000 lbs.

Paper Car-Wheels.

THE Chicago *Railway Review* calls attention to a new car-wheel, the body of which is made of paper. Two trucks equipped with these wheels, after running nearly a year on Eastern roads, were transferred to Pullman's Palace-Car line, under which they have been used for several months, and show no signs of wear. Their construction is difficult to describe in detail without drawings and diagrams. They consist, however, mainly of a tight filling, between tire and hub, of *pressed paper*—paper of the best fibre, subjected to a pressure of a ton and a half to the square inch.

But few, we suppose, are conversant with the capabilities of compressed paper. The very best "calender-rolls"—used in finishing "sized" paper, and for some other purposes—are made of pressed paper, in preference to ivory, bone, steel, or other material. The reasons are that it is not only almost wholly inelastic, but yields nothing to climatic changes. Hot or cold, wet or dry, *paper* thus treated remains the same. When sufficiently pressed, it may be treated as hard wood is; it may be turned in a lathe; holes may be drilled or bored in it; it is susceptible of a high degree of polish, etc. In short, it is unlike any thing and every thing but itself. The inventor conceived the idea of using pressed paper in the construction of car-wheels, because wood and all other substances thus far tried have been found objectionable in one point or another. Paper would seem to answer the purpose admirably, because it is *noiseless;* it does not swell or shrink with the weather; it affords a stay to the tire and a lateral support in turning curves; and at the same time adapts itself to any trifling inequality of the inner surface of the surrounding tire, which

wood or iron fails to do; and, finally, it seems to be stronger than any other material—many times stronger than any other material of the same weight—of which a wheel can possibly be made. Wood has been tried, not altogether with success; and the objections to steel skeleton, or corrugated, or patent-spoke wheels are well understood.

In these wheels, the usual steel tire with its "rail flange" is used. Upon the axle as a centre, two heavy wrought-iron flanges are fastened parallel to each other at right angles with the axle, and in the plane of the diameter. The inside one has an 8-inch radius; the outside one completely covering the outer disk, and overlapping the tire half an inch. Through the compressed paper, from flange to flange, are passed strong bolts of the best iron, secured by nuts "screwed home" firmly, and near enough together to hold the paper in its place, without unnecessary cutting away of its fibre or weakening the flanges. And it is worthy of note, that it has never been found necessary to tighten a nut on any of them from the first day of operation to the present! The paper forms a solid wall between the axle and the tire; the flanges doing nothing but keep the paper in proper position. The strain comes upon the paper—the tire, of course, doing its duty as in every other wheel.

Preserving Railway Ties.

WHILE, in European countries, the preservation of railway ties is almost universal, there is still a great indifference in this country concerning this subject. It is true that the press has of late given greater attention to wood preservation; but while doing so, it has failed to point out those processes which alone have given satisfaction. In order to be generally applicable, the impregnating material, especially for railway ties, must be cheap and easily accessible. The machinery, while inexpensive, should be light, and so constructed as to be readily movable to the spot where the ties are to be treated; and finally, the saturating material ought to be of the best preserving qualities. But what is to be said when alleged preservatives, long ago rejected in Europe, are gravely offered to the American public, as has lately been done by the author of the *Practical Treatise on Soluble or Water Glass*, a book almost unanimously praised as a meritorious publication of technical literature? Indeed, in such instances, information is very much needed.

In order to afford protection against decay, the preparation employed should form an insoluble compound with the albumen of the sap; it should seal the pores against the entrance of putrescent matter; and the ligneous fibre should not be injuriously affected by its action. Among the many compounds proposed, there it not any one which will meet these requirements as well as oil of creosote, or the heavy oil of coal-tar. Having proved a perfect preservative from decay in all instances when properly applied, this oil is now, with a very few exceptions, universally used on European railways. Ties properly creosoted have never been known to rot, even if exposed for over twenty-five years. The density of the wood is also greatly increased, and the ties acquire almost the density of oak.

Concerning the plans for impregnating wood, our remarks shall apply to the pressure process, the vapor process, and the method of Seely.

THE PRESSURE PROCESS.

The wood and liquid being contained in and nearly filling a closed and strong iron receptacle, more liquid is pumped in till a high pressure is attained, and the liquid is forced into the pores of the wood. The pressure required for the purpose approaches two hundred pounds to the square inch, and the apparatus is consequently very heavy and expensive. Only well-seasoned and dry wood is suitable for this process, as it is evident that, if the pores of the wood be occupied with sap, no amount of simple pressure will so condense the sap as to permit the entrance of the preservative liquid. The great cost of setting up and working this process, and the fact that it can not be effectively used for unseasoned lumber, have prevented its extensive introduction into the United States.

THE VAPOR PROCESS.

This process was first carried out on an extensive scale by Lucken, in 1811, and was revived in England by Frantz Moll, in 1835, and quite recently by several inventors in this country. This plan was proposed at a time when the value of antiseptics was overestimated, and when the necessity of sealing the pores of the ligneous tissue was overlooked. It was also supposed that, by simply exposing the wood to the vapor of coal-tar, a sufficient amount of the antiseptic would be carried into the pores to afford perfect protection. Leaving out of the question the injury of the wood by the great heat (400° to 700° Fahrenheit) necessary to volatilize the products employed, it is evident, since the space occupied by creosote vapor is eleven hundred times that of the same weight of liquid creosote, no available amount can be got into the wood. And even if it should be completely permeated, no useful end will be attained, owing to the fact that the vapor on condensation will leave the pores empty.

THE SEELY PROCESS.

The writer has already had occasion to call attention to this process, by which, within the past three years, large quantities of railroad timber have been successfully treated. Although one of the most recent processes, it has attained a high reputation, and is already spoken of as the only one fulfilling the requirements of scientific and practical investigation.

The process, in brief, consists in subjecting the wood to a temperature above the boiling-point of water and below 300°, while immersed in a bath of creosote oil for a sufficient length of time to expel the moisture. When the water is thus expelled, and the pores contain only steam, the hot oil is quickly replaced by a bath of cold oil, by means of which change the steam in the pores of the wood is condensed, and a vacuum formed, into which the oil is forced by atmospheric pressure and capillary attraction. Among the advantages of this plan, the following may be named: The thorough air-drying which is required by the pressure process is obviated; the expulsion of the sap, and the amount of oil forced into the wood, is perfectly under the control of the operator—any desired fraction of the vacuum of the pores may be filled at pleasure. On examination with the microscope, of wood saturated by Seely's method of treatment, every pore was found completely filled with oil, and this not only on the surface, but also in the centre of the piece examined.

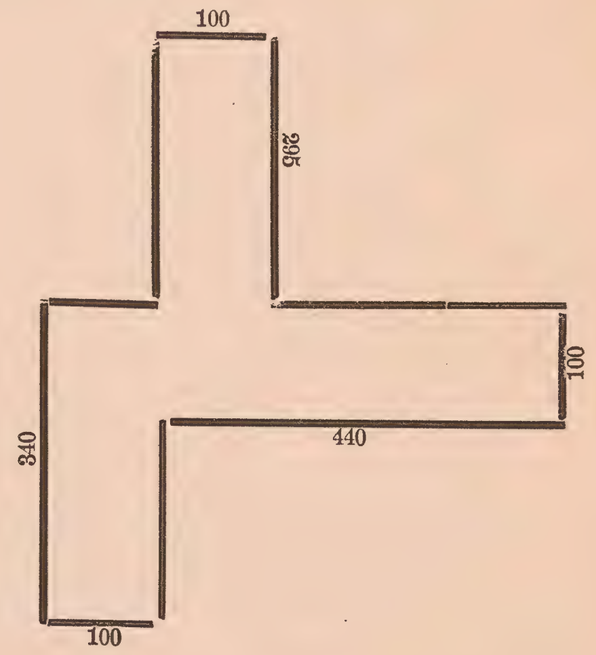
Train Signal-Light.

A SIGNAL-LIGHT to be attached to the rear of trains, invented by two officers of the Little Miami Railway, has lately been tested on that road. It is thus described: "In the centre of the roof of the rear car of the train, over the rear axle, is placed a square lantern, with alternate panes of red and white glass. The lantern is connected by means of a shaft with one of the axles in such a manner that eight revolutions of the axle produce one of the lantern. When the car stops, the lantern of course ceases to revolve. Upon each side of this main lantern are two others, also connected with the axle in such a way that when the train is moving forward a solid red light is displayed, and if backing, a solid green light. The engineer of a train coming up in the rear can thus tell, by observing these lights, whether the train before him is moving or at a standstill, and, if moving, in which direction.—*Railway Times.*

HON. JOHN B. TURNER, long and extensively identified with the railroad interests of the North-west, died at Chicago on the 26th of February.

Cumberland Rolling-Mill.

THE Baltimore and Ohio Railroad Company has just completed at Cumberland a new rolling-mill for the manufacture of steel and iron rails. It was located in October, 1869, and planned and erected under the supervision of Mr. John C. Davis, master of machinery of the road, aided by Mr. David Holtz, under whose direction the machinery has been put up, every portion of which has been manufactured in the shops of the company. Every part of the mill is of the most complete and substantial character. The general form of the structure is shown in the diagram, the entire length being 540 feet, with two wings, 295 and 240 feet, respectively.



The height from floor to apex is 70 feet. The columns supporting the roof are composed of four pieces of nine-inch timber, bolted together, and so arranged that any one of the pieces can be taken out in case of decay or injury, and replaced by a new one. The puddling-mill has twelve double puddling-furnaces, three sets of rolls in the roll-train, and one squeezer attached; also three pairs of hot shears, all driven by one double engine with 24-inch cylinders and 30-inch stroke, and a fly-wheel 30 feet in diameter. The steam for driving this and the rail-train engine is furnished by three locomotive boilers. In one of the wings is located a 5000-pound steam-hammer for hammering a portion of the puddling-balls. At the extreme end of the main building are the shears for cutting up old rail. There are two pair of hot shears and another train of rolls for making tops and bottoms; also sixteen heating-furnaces, eight of which are used for heating the tops and bottoms of rail-piles, and eight for heating the rail-piles. In the main centre of the building is the rail-train, which is also driven by a double engine with 24-inch cylinders, 30-inch stroke, and a fly-wheel 30 feet in diameter. Then there is a hot-bed, blower, two saws, a punching-machine, and two straightening presses, driven by an engine with 20-inch cylinders and 4 feet stroke. The four engines in the mill are supplied with steam by five boilers which are separate from the furnaces, thus dispensing with steam-pipes overhead and giving the mill a clean and tidy look. The blast-pipe is under ground. In taking the rails from the hot-bed to the straightening presses, they are not raised two feet as usual, the presses being that much below the regular grade. This saves a good deal of labor. The rails are shipped from the end of the 240 foot wing. As they leave the hot-bed, they are placed in a car some six feet lower than the grade of the building. The mill is now in full operation, and is capable of turning out 100 tons of rail per day. Like all the other shops of the company, it is most complete in all its appointments, and reflects great credit upon the above-named gentlemen who planned and constructed the building and machinery.

GEORGE H. STEM & Co., of Stemton, Northampton County, Pa., employ 160 men in their car-works, have three full sets of machinery, and are able to turn out twelve 6-ton coal-cars a day by working overtime.

The Vanderbilt Depot.

THE thousands who are interested in the passenger traffic of the New-York Central, Hudson River, Harlem, and New-Haven roads, will be glad to learn that the grand central depot on Fourth avenue is rapidly approaching completion. When finished and ready for use, much of the annoyance and inconvenience to which passengers using these lines are now subjected will be obviated. We copy from the *New-York Standard* the following description: "The principal entrance is on Forty-second street, and is three stories high, and finished in the *renaissance* style of architecture. There are three large towers rising to a height of 110 to 126 feet above the elevation, the centre one having an arched roof and a fine illuminated timepiece. Over the main entrance will be placed, in a niche, a bronze statue of Commodore Vanderbilt. In the south-west corner of the building, and leading into it, are the spacious baggage-rooms to be set apart for the New-Haven line. The ground-floor is taken up with the waiting-rooms and ticket-office, and the basement will be filled up with refreshment-rooms, barbers' shops, and other conveniences. The second and third stories will be dedicated to the offices of the company. The west front is 700 feet in length, with gables 70 feet high, in which are two entrances, one at Forty-third street, for the Harlem road, and another at Forty-fourth street for the H. R. and N. Y. C. The lower portion of this building will be similar to the arrangements on the south-west corner, with the exception that here there will be some portion set apart for general business purposes.

The gigantic car-house is the centre of attraction, and the immense roof has nearly been covered in. Inlength it is 600 feet, and 200 feet wide. The roof is beautifully arched, at an elevation of 80 feet from the level of the tracks, and rises to 115 feet clear. Ample light is thrown into the building by the aid of an immense dome—the whole being supported by Hawe's patent trusses of iron. In this house there are twelve tracks, which lead to a broad landing-platform. At the rear sufficient accommodation has been provided for disposing of the numerous empty cars which are always to be found lying idle on all lines, for cases of emergency; and numerous other storage and fuel-houses are thought of, and every facility has been given for the arrival and departure of trains which are constantly working."

The Grain of Wrought-Iron.

WHILE good wrought-iron shows a uniform jagged grain, moderate in size, the grains of cold-short iron are arranged in a somewhat stratified manner. Wrought-iron rendered cold-short by a continued cold-hammering (the aggregation of the iron being thus deranged) shows a fine grain with a strong lustre. Burnt iron has coarse, uneven, angular grains of strong lustre; iron containing particles of crude metal, uneven, coarse, and fine grains; iron which is brittle, owing to the presence of silicon, a mixed grained and fibrous texture.

Water-proof Glue.

WE find the following in *The Builder*: "One ounce of gum sandarac and one ounce of mastic are to be dissolved together in a pint of alcohol, to which an ounce of white turpentine is added. At the same time a very thick glue is to be kept ready mixed with a little isinglass. The solution of the resin in alcohol is to be heated to boiling in a glue-pot, and the glue added gradually with constant stirring, so as to render the whole mass homogeneous. After the mixture is strained through a cloth, it is ready for use, and is to be applied hot. It dries quickly and becomes very hard, and surfaces of wood united by it do not separate when immersed in water."

REMEDY FOR FITS.—Buy your clothes at a slop-shop, and you will never have a fit afterward.

California Woods.

A CORRESPONDENT of the San Francisco *Scientific Press* gives the following description of the Chicago office of the Pullman Car Company:

"The offices here are fitted up splendidly; handsomer ones, perhaps, do not exist in the United States. Black-walnut woodwork, frescoed and paneled ceilings and walls, rich carpets, magnificent furniture—every thing in the finest style and most exquisite taste. One of the rooms is a real curiosity; for it is papered with a material printed from the fibres of different woods, by some process, and so perfectly that it is almost impossible to think that the walls are not veneered with the real woods. The place is well worth a long trip to see.

"The affairs of the company are conducted in a most thoroughly systematic order. The master-spirit, whose influence is visible everywhere, is Mr. George M. Pullman, from whom the company gets its name. Mr. Pullman, by the way, awards to California the prize for superiority in wood suitable for car-building. He has in his office a collection of sample-woods from the Pacific coast, the names of which I send you. Those in italic are California coast woods:

"Oregon ash, (very well liked,) *abazo veva, primavera, ebony, aquilado,* coffee-wood, Alaska cedar, *male linola, female linola, cabo de hacho, California beech,* red-wood, Colorado leno, tecomate, mountain mahogany, Oregon cedar, *blood-wood, lance-wood,* Lower Coast ebony, tiger-wood, *chilillo,* campeche, lena tuerte, and temisquito.

"Connected with the offices is the manufactory of bedding, mattresses, etc., for the cars. Spring mattresses, among other things, are furnished here. The supply-rooms look like huge wholesale grocery, glass, and hardware establishments. Every thing is of the best, the handsomest, and the neatest."

The Life of Rails.

IN the last annual report of the Lehigh Valley Railroad Company, some interesting facts are given concerning the use of steel rails on the road. The experience of the past year has been satisfactory. The steel rails laid in 1864, on the Beaver Meadow Division, look as well as they did a year since, with the exception of three rails, which show signs of wearing out. During the past year, 13.93 miles of track have been relaid with steel, making the amount of steel track now 32.31 miles. In 1869, the company laid 1530 tons of the best English iron rails, guaranteed to last from five to seven years; but they have not proved satisfactory, and the report says that it is demonstrated that "nothing short of all steel, or steel-headed rails, will prove economical under the present heavy and rapidly increasing traffic of the road." The relative value of steel and iron is illustrated by the experience at the scales at Packerton. The first iron rails laid upon the scales lasted 1 year and 23 days, and passed a tonnage of 2,263,675 tons. The second set of iron rails were in use 7 months and 19 days, and passed a tonnage of 1,524,870 tons. Steel rails, laid May 28th, 1869, have passed 5,509,381 tons, and show no perceptible wear. The company has contracted for 1000 tons of steel rails to be laid this year, and we judge that before many years the whole road will be relaid with steel. All our other railroads having a heavy traffic to carry will probably be relaid in the same manner.—*Evening Bulletin.*

A VARNISH recommended as well adapted for lacquering pictures and engravings, as well as for preserving dried plants and flowers, is prepared by pounding up ten ounces of gum sandarac, four ounces of mastic, and half an ounce of camphor, and adding three quarts of strong alcohol. The mass is to be frequently shaken up, and finally placed in a warm situation until it settles. Plants coated with this varnish will, it is said, be protected from destruction by insects, and will retain their colors fresh and unchanged. This varnish does not peel off, and therefore can be applied very thin.

Communications.

EDITOR OF THE NATIONAL CAR-BUILDER:

IN the last number of your paper, I notice an article copied from the *New-York Herald*, in which the writer undertakes to inform the public *why trains jump the track.* It occurred to me on reading the article, that the writer could occupy his time more profitably in helping us poor mechanics out of our troubles by giving his theory a practical demonstration. He says the occurrence of accidents like the one at New-Hamburg is owing to the faulty running-gear now in use, and objects to the truck because it swivels or turns. How he would contrive, to get a car fifty or sixty feet long round a curve, he does not say. Perhaps he is not aware that our railroads, especially those in the more rugged and mountainous sections of the country, are not entirely straight, but have numerous curves, branches, and turn-outs, some of them necessarily at sharp angles. To meet these difficulties, the swivel truck was introduced, and has been considered a great and indispensable improvement. The writer objects to the coning of the wheels; but this does not seem to be a very important matter, as there is not more than five eighths or three quarters of an inch space between the wheels and rails, or rather three eighths on each side. He then proceeds to develop his plan by recommending that each wheel be keyed to separate axles having inside and outside bearings; but his acquaintance with the business of car construction must be very slight indeed, or he would have known that this plan has been repeatedly tried, and as often abandoned as a failure. Trucks were built in this way twenty years ago. Another idea suggested by the writer is the use of a tongue similar to the ordinary wagon-tongue, to be confined to the centre. This might do on a perfectly straight track; but how would such a device work where trains turn a short corner, as they do in getting from Fourth avenue into the depot at Twenty-seventh street, in New-York? It seems to me that such crude suggestions can have no other effect with practical car-builders than to provoke a smile, or excite a little momentary surprise that writers like the one referred to should not more thoroughly examine a subject before giving their views publicity.

CAYUGA.

Miscellaneous Items.

THE Taunton Car Company, under the general superintendence of S. W. Remer, have nearly completed two elegant Pullman day parlor-cars, intended for the route between Rochester and Chicago *via* Niagara Falls. These cars are named Leo and Mars, and will cost about $25,000 each when finished. They are sixty-five feet in length and furnished with Miller's patent platform, which avoids jerking when a sudden stop or start is made. On each end of the car is a spacious smoking-room. The two next compartments are fitted up as closets and wash-rooms. A small space is reserved for the storing away of light baggage and parcels. In the centre of the car is "Le Grand Salon," or parlor, upholstered and furnished in luxurious style. Beyond the parlor are two large retiring or dressing-rooms for ladies.

THE following figures serve to show the magnitude of railway traffic in England and Scotland: On sixteen of the leading lines of road there are, 7925 locomotives, 17,636 passenger-cars, 135,990 freight-cars, 8575 cattle-cars, and 73,750 coal-cars.

THE Lake Shore and Michigan Southern Railroad Company will shortly commence to lay a second track between Toledo and Buffalo, and from Elkhart to Chicago, using steel rails.

TASTE is the origin of fashion; and as there is bad as well as good taste, fashion must be either the one or the other. Now, as personal comfort may be considered to be governed by taste, it is natural to conclude that what is positively uncomfortable is, in the very same degree, founded on bad taste. We are, in our generation, too much at the mercy of the cabinet-maker, and are apt to furnish our houses with whatever that artisan calls fashionable; and as to be out of the fashion is to be exceptional in the eye of the world, we too often find ourselves yielding up our comfort to the mere ephemeral whim of the day. Architects, when commissioned to provide designs for the furniture of a mansion they have constructed, are invariably governed in their taste by the style of the building, and this is very natural; yet, in some cases, and they are not a few, this very observance of unity in design is apt to lead to discomfort, and consequently to come under the stigma of bad taste.

WE have not reached absolute perfection in America in warming railroad-cars, we must confess; but the perusal of the following, in *Herapath's Journal*, reminds us that we are at least better off than our English cousins when the thermometer is below zero. It is headed "Foot-Warmers:"

"It is certainly great misery in cold weather to travel long distances by railway without the comfort of a foot-warmer, nor can we doubt that the general provision of this accommodation to all classes of travelers would operate to increase traffic. But railway companies can not be expected to provide foot-warmers for nothing. A small charge would, however, cover the expense of foot-warmers, and even add directly to the net income of the companies."

THE completion of the railroad bridge over the Ohio River at Parkersburg greatly adds to the facilities for transacting through business from Cincinnati to Baltimore. A full equipment of Pullman's drawing-room and sleeping-cars has recently been placed on the line, and will leave Cincinnati with each through train. These cars have been built expressly for the route, and are models of elegance and comfort

THE destruction by fire, on the 7th February, of the Pittsburg works of Messrs. Smith & Porter, manufacturers of mining and narrow-gauge engines, was a calamity to the railway world. They had engaged in the building of narrow-gauge locomotives, 12 of which, just completed, were destroyed. They were -wheel.

MESSRS. WILLIAMS, PAGE & Co., Boston, Mass., manufacturers of passenger-car lamps, have recently introduced to railroads a new lamp, with flat wicks, which burns the Downer mineral sperm-oil for passenger-cars. This oil is not kerosene, but a product of the heavy oil after the kerosene and light oils have passed off.

Facetiæ.

A BARRISTER blind of one eye, pleading, with his spectacles on, said, "Gentlemen, in my argument I shall use nothing but what is necessary." "Then," whispered a wag, "take one of the glasses out of your spectacles."

The best cough-mixture that has been made consists of a pair of thick boots, mixed with lots of air and plenty of exercise. People who hug the stove and grow lean will please take notice.

A VERY pretty lady was one day asked if she would wear a wig when her hair turned gray. "Oh!" said she, "I could not endure it at all; I'd *dye* first."

Punch says, "The greatest organ in the world is the organ of speech in woman; an organ, too, without a stop."

Car-Wheel Manufacturers.

Atlantic Iron-Works	Portsmouth, Va.
Barnum & Richardson Manufacturing Co.	Chicago, Ill.
Barney & Smith Manufacturing Co.	Dayton, Ohio.
Bass & Hanna	Fort Wayne, Ind.
Davenport, Fairbairn & Co	Erie, Pa.
Dawson Manufacturing Co	Dawson, Ga.
Detroit Car-Wheel Works	Detroit, Mich.
Gill & Bidwell	Allegheny City, Pa.
Harrisburg Car Manufacturing Co	Harrisburg, Pa.
Jackson & Woodin	Berwick, Pa.
John L. Gill	Columbus, Ohio.
Lobdell Car-Wheel Works	Wilmington, Del.
Missouri Car and Foundry Co	St. Louis, Mo.
Moore Elastic Car-Wheel Co	Jersey City, N. J.
Mowry Car and Wheel Works	Cincinnati, Ohio.
Ramapo Wheel & Foundry Co	Ramapo, N. Y.
Scoville J. & N. C	Buffalo, N. Y.
Taylor Iron Works	High Bridge, N. J.
Thompson Douglas	Bordentown, N. J.
Tredegar Company	Richmond, Va.
Washburn, Hunts & Co	Jersey City, N. J.
Whitney & Sons	Philadelphia, Pa.
Woodbury & Company	E. Cambr'ge, Mass.
Wyoming Valley Manufacturing Co	Wilkes-Barre, Pa.

Locomotive Builders.

Baldwin Locomotive Works	Philadelphia, Pa.
Brooks Locomotive Works	Dunkirk, N. Y.
Danforth & Cooke	Paterson, N. J.
Dickson Manufacturing Co	Wilkesbarre, Pa.
Grant Locomotive Works	Paterson, N. J.
Hinckley & Williams	Boston, Mass.
Manchester Locomotive Works	Manchester, N. H.
Mason, William	Taunton, Mass.
McKay Iron and Locomotive Works	Jersey City, N. J.
Portland Company	Portland, Me.
Pittsburg Locomotive Works	Pittsburg, Pa.
Rogers Locomotive Works	Paterson, N. J.
Rhode Island Locomotive Works	Providence, R. I.
Schenectady Locomotive Works	Schenectady, N. Y.
Smith & Porter	Pittsburg, Pa.
Taunton Locomotive Works	Taunton, Mass.

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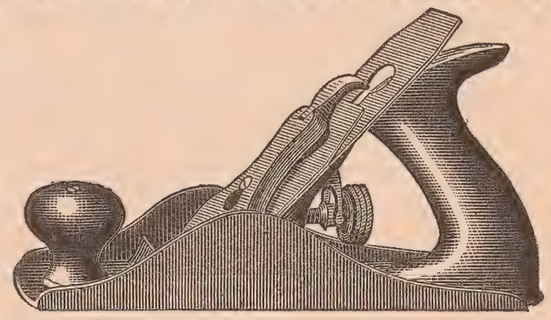

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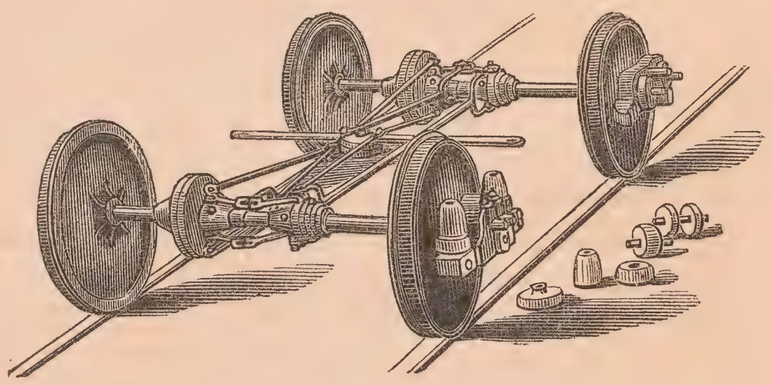

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Alabama & Chattanooga	H. M. Smith	H. M. Smith	Chattanooga, Tenn.
Atlantic & North-Carolina	E J. Clayton	E. J. Clayton	New-Berne, N. C.
Atlanta & West-Point	Wm. Rushton		Atlanta, Ga.
Atlanta & West-Point	R. D. Cole		Newnan, Ga.
Atlantic & Pacific	J. N. C. Wellinger		Pacific, Mo.
Allegheny Valley	G. W. Glass	R. Gunning	Pittsburg, Pa.
Androscoggin	Ira K. Russell	C. S. Greenwood	Farmington, Maine.
Adirondack			Saratoga, N. Y.
Alexandria, Loudon & Hampshire	Nathaniel Hayes	Nathaniel Hayes	Alexandria, Va.
B			
Bay de Noquet & Marquette	John J. Murphy	H. D. Lyons	Marquette, Mich.
Bangor, Old Town & Milford	J. B. Peckham	John H. Brown	Bangor, Maine.
Bennington & Rutland	John Haining		Rutland, Vt.
Baltimore & Ohio	John C. Davis	John C. Davis	Baltimore, Md.
Bellefonte & Snow Shoe	H. D. Landis	H. D. Landis	Bellefonte, Pa.
Belvidere Delaware	R. McDowell	John Silvers	Lambertville, N. J.
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Boston & Albany	A. B. Underhill	W.E.Chamberlain	Boston, Mass.
Boston & Providence	George Richards	John Lightner	Roxbury, Mass.
Boston, Clinton & Fitchburg	John Webster	Samuel Stevens	Fitchburg, Mass.
Boston, Concord & Montreal	R. Adams	M. R. Elkins	Lake Village, N. H.
Boston & Maine			Boston, Mass.
Boston & Maine		D. C. Richardson	Lawrence, Mass.
Boston & Lowell & W. L.	L. R. Winslow	S. A. Davis	Boston, Mass.
Blossburg & Corning	O. C. Patchell	O. C. Patchell	Corning, N. Y.
Brockville & Ottawa	Joseph Cockfield	Joseph Cockfield	Brockville, Can.
Blue Ridge			Anderson, S. C.
Burlington & Missouri River	G. Chalender	G. Chalender	Burlington, Iowa.
Burlington, Cedar Rapids & Minn.	Wm. Swanston	Wm Swanston	Cedar Rapids, Iowa.
Buffalo & Erie (see Lake Shore)	William Hart	J. N. Mileham	Buffalo, N. Y.
Buffalo & Washington			Buffalo, N. Y.
Boston, Hartford & Erie	I. E. Wiggins	Elias Pratt	Boston, Mass.
Buffalo, Corry & Pittsburg	Thomas Connell	Thomas Connell	Corry, Pa.
Buff. Bayou, Brazos, Colorado	E. Perry	M. Borst	Harrisburg, Tex.
C			
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Camden & Amboy	F. B. Stevens		Hoboken.
	T. T. Kerr	E. Lockwood	Bordentown, N. J.
	Thomas Single		South-Amboy.
Camden & Atlantic	E. Collings	S. Wills	Camden, N. J.
Catawissa	A. J. Prescott	G. P. Fenstermacher	Catawissa, Pa.
Cape Cod	E. A. Walker	William Cannon	Hyannis, Mass.
Calais & Baring	Chas. W. Butler	Chas. W. Butler	Milltown, Me.
Cascade	E. Copley	James Smith	Cascades, W. T.
Catasauqua & Fogelsville	Thomas Evans	Chas. S. Holbach	Catasauqua, Pa.
Carrolton & Oneida	M. T. Wiggins		Carrolton, Ohio.
Charleston & Savannah	H. T. Calder		Charleston, S. C.
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Cheraw & Darlington	D. W. Haines		Florence, S. C.
Champlain Trans. Co	H. T. Calder		Burlington, Vt.
Cheshire	F. A. Perry	F. A. Perry	Keene, N. H.
Charlotte & South-Carolina	T. D. Kline	W. T. Brown	Columbia, S. C.
Chicago & North-western		Thomas Hull	Chicago, Ill.
Wiscon. Mad. & Mill. Divis	T. B. Tilton	Henry Hull	Fond du Lac, Wis.
Galena Division	R. W. Bushnell	Hugh Gray	Chicago, Ill.
Chicago & N. W. Iowa Division	C. C. Elliott	William Campbell	Clinton, Iowa.
Chicago & N. W. Peninsula Division	S. L Pierce		Escanaba.
Chicago & Alton	John A. Jackman	R. Reniff	Bloomington, Ill.
Chicago, Burlington & Quincy	C. F. Jauriet	W. W. Wilcox	Aurora, Ill.
Chicago, Cincinnati & Louisville	C. F. Kidder	D. B. Howe	La Porte, Ind.
Chicago, Rock Island & Pacific	T. B. Twombly	J. I. Fogg	Chicago, Ill.
Chicago, Michigan & Lake Shore	E. I. Reynolds		St. Joseph, Mich.
Cleveland, Col., Cin., & Indianapolis	L. S. Young	William F. Smith	Cleveland, Ohio.
Cleveland and Pittsburg	N. E. Chapman	N. E. Chapman	Cleveland, Ohio.
Cleveland, Zanesville & Cincinnati	J. W. Holloway	J. W. Holloway	Akron, Ohio.
Cincinnati, Hamilton & Dayton	William Cullen	W. H. Allison	Cincinnati, Ohio.
Cincinnati & Zanesville	Peter Green	D. J. Jewell	Lancaster, Ohio.
Cincinnati & Indianapolis Junction	O. H. P. Little	W. W. Degnacey	Cambridge, Ind.
Cincinnati, Sandusky & Cleveland	John T. Beatty	William Earick	Sandusky, Ohio.
Columbus, Chicago & Indiana Central			
Concord	E. Studley	M. W. Dickerman	Concord, N. H.
Concord & Claremont	J. N. Lander	A. Langmaid	Concord, N. H.
Connecticut River	John Mulligan	J. Hitchcock	Springfield, Mass.
Contoocook River			Concord, N. H.
Conn. & Passumpsic Rivers	Horace Alden	Horace Alden	Lyndon, Vt.
Cumberland Valley	A. S. Hull	C. W. Nitterhouse	Chambersburg, Pa.
Cumberland & Pennsylvania	W. L. Jordan	J W. Sauerbach	Mt. Savage, Md
Central of Georgia	B. L. Boulineau	C. C. Millar	Savannah, Ga
Central of New-Jersey	†T. W. Peeples	George Hackett	Elizabethport, N. J.
Central Branch Union Pacific	Wm. D. Rowley	W. A. Grubb	Atchison, Kansas.
Central R. R. of Iowa	H. P. Vedder	H. P. Vedder	Elden, Iowa.
Central Pacific	A. J. Stevens	Benjamin Welch	Sacramento, Cal.
D			
Dayton & Union	A. J. Keenan	J. F. Feicht	Dayton, Ohio.
Danbury & Norwalk	Charles A. Craig	Wm. W. Bedient	Danbury, Ct.
Dayton & Michigan	William Cullen,	W. H. Allison	Cincinnatti, Ohio.
Delaware, Lackawanna & Western	Walter Dawson	Robert McKenna	Scranton, Pa.
Des Moines Valley	Morris Sellers	R. E. Smith	Keokuk, Iowa.
Detroit & Milwaukee	B. Briscoe	B. Briscoe	Detroit, Mich.
Delaware & Hudson Canal Co.	James Dickson	Thomas Orchard	Carbondale, Pa.
Dorchester & Delaware			Cambridge, Md.
Dubuque South-western	J. M. Williamson	J. M. Williamson	Farley, Iowa.
Dutchess & Columbia			Washington, N. Y.
E			
Eastern		J. P. Somerby	Salem, Mass.
Eastern	John Thompson		East-Boston, Mass.
East-Tennessee & Virginia	Jos. Armbruster	Jos. Armbruster	Knoxville, Tenn.
East-Tennessee & Georgia	Eli Hixon		Knoxville, Tenn.
East-Pennsylvania	J. M. Geary	Samuel Reeves	Reading, Pa.
Erie Railway	*E. O. Hill		Susquehanna, N. Y.
Erie Railway	James B. Gregg		
Erie Railway	H. L. Brown	C. A. Smith	Jersey City, N. J.
Erie Railway	M. E. Brown	M. Wilder	Buffalo, N. Y.
Erie Railway	W. E. Cooper	W. E. Cooper	Hornellsville, N. Y.
Erie Railway		W. E. Rutter	Elmira, N. Y
Evansville & Crawfordsville	John L. White	A. Sharra (fore'n)	Evansville, Ind.
Evansville, Henderson & Nashville	W. H. McCafferty	W. H. McCafferty	Nashville, Tenn.
European & North Am. (of Maine)	A. O. Bailey	J. H. Brown	Oldtown, Maine.
Erie & Pittsburg	John Young	John Young	Erie, Pa.
Eldora			Dubuque, Iowa.
F			
Florida	A. W. Taylor	G. Hernandez	Fernandina, Fla
Flint & Pere Marquette	Sanford Keeler	Sanford Keeler	East-Saginaw, Mich.
Fitchburg	Geo. A. Cooledge	Enos Varney	Charlestown, Mass.
Fitchburg & Worcester			Fitchburg, Mass.
G			
Grand Trunk	*Richard Eaton	J. W. W. McWood	Montreal, Canada.
Galveston, Houston & Henderson	William McBeth	E. J. Sherman	Galveston, Texas.
Grand River Valley		James Potts	Jackson, Michigan.
Grand Rapids & Indiana			Fort Wayne, Ind.
Great Western of Canada	*Wm. A. Robinson		Hamilton, Canada.
Georgia	William Hardman	Samuel Frost	Augusta, Ga.
Greenville & Columbia		J. O. Meredith	Helena, S. C.
H			
Hanover Branch	John J. Bingley	Henry Britcher	Hanover, Pa.
Hartford & New-Haven	N. Slingland	F. Leppense	Hartford, Ct.
Hannibal & St. Joseph	H. A. Towne	H. C. Whiting	Hannibal, Mo.
Hartford, Providence & Fishkill	Edwin Garfield	V. D. Perry	Hartford, Ct
Hackensack & New-York	Abra'm Angausen		Hackensack, N. J.
Hastings & Dakota	C. C. Clements		Hastings, Minn.
Housatonic	C. R. Morris	J. Ferris	Bridgeport, Ct.
Houston & Texas Central	Reuben B. Snyder	J. F. Rice	Houston, Texas.
Houston Tap & Brazoria	A. Malsch	R. H. Yeomans	Houston, Texas.
Huntington & Broad-Top Mountain	D. G. Gilchrist	M. Tellerhoof	Saxton, Pa.
Hempfield	T. Marsh		Wheeling, Va.
Hudson River	Wm. Buchanan	John McKenna	New-York.
Hudson River	John Dykeman	Charles D. Mills	East-Albany, N. Y.
I			
Indianapolis, Cincinnati & Lafayette	H. M. Britton	H. M. Britton	Cincinnati, Ohio.
Indianapolis, Peru & Chicago	John McKenna	John McKenna	Peru, Ind.
Illinois Central	S. Hayes	C. Scoville	Chicago, Ill,
Iowa & Missouri State Line			Farmington, Iowa.
Iron	Perry Scott	Clem. Roetling	Ironton, Ohio.
Indianapolis & St Louis	C. E. Benton	C. E. Benton	Mattoon, Ill.
Indianapolis, Bloomington & Western		S. S. Smith	Urbana, Ill.
Ionia & Lansing	H. Loughlin		Lansing, Mich.
J			
Jeffersonville, Madison & Indiana	Reuben Wells	John Higgins	Jeffersonville, Ind.
Jackson, Lansing & Saginaw	Andrew Wilson	A. Wilson	Jackson, Michigan.
K			
Keokuk & St. Paul	P. R. Sutton	Wm. McElroy	Keokuk, Iowa.
Knox & Lincoln			Bath, Maine.
Kentucky Central	J. R. Ledyard	J. L. Hackenthorn	Covington, Ky.
Knoxville & Charleston			Knoxville, Tenn.
Kansas Pacific	Geo. W. Cushing	Geo. W. Cushing	Wyandotte, Kansas.
Kalamazoo, Allagan & Grand Rapids			Kalamazoo, Mich.
Kansas City, St. Joseph & Council Bluff	H. L. Cooper		St. Joseph, Mo.
L			
Lake Erie & Louisville	John Pero		Fremont, Ohio.
Lackawanna & Bloomsburg	Chas. Graham		Kingston, Pa.
Lehigh Valley	J. Kinsey		South-Easton, Pa.
Lehigh Valley	P. Hofecker	E. R. Brown	Weatherly, Pa.
Lehigh Valley	A. Mitchell	Mauch Chunk, Pa.	Delano, Pa.
Lehigh Valley	D. Clark		Hazelton, Pa.
Lehigh & Susquehanna	L. C. Brastow	L. C. Brastow	Wilkesbarre, Pa.
Lehigh & Susquehanna	Wm. H. Brown		Mauch Chunk, Pa.
Leavenworth, Lawrence & Gal.	S. Philbrick		Lawrence, Kansas.
Lewy's Island	C. W. Button	Damase Merceir	Milltown, Maine.
Little Rock & Fort Smith			Little Rock, Ark.
Lebanon Springs			Burlington, Vt.
Little Miami, Col. & Xenia	J. H. Setchel	M. P. Ford	Cincinnati, Ohio.
London & Port Stanley			London, C. W.
Louisville, New-Albany & Chicago	Jacob Losey	Jacob Losey	New-Albany, Ind.
Long Island	Chs. A. Thompson	E. A. Olmstead	Hunter's Point, L.I.
Louisville, Cincinnati & Lexington	John Skidmore	Theo. G. Shaw	Louisville, Ky.
Louisville & Nashville	Thatcher Perkins	Thatcher Perkins	Louisville, Ky.
Lake Shore & Michigan Southern	†James Sedgley		Cleveland, Ohio
Michigan Southern Division	James K. Taylor	John Kirby	Adrian, Mich.
Buffalo Division	B. H. Kidder.		Buffolo, N. Y.
M			
Macon & Augusta			Macon, Ga.
Maine Central	J. W. Philbrick	J. W. Philbrick	Waterville, Me.
Macon & Western	B. Pope Freeman	James A. Knight	Macon, Ga.
Manchester & Lawrence	Edward Studley	M. W. Dickerman	Concord, N. H.
Macon & Brunswick	M. Thornton	M. Thornton	Macon, Ga.
Maysville & Lexington			Maysville, Ky.
Marietta & Cincinnati	E. Bosley	E. Bosley	Chillicothe, Ohio.
Memphis, Clarksville & Louisville			Clarksville, Tenn.
Memphis & Little Rock	D. R. Wing		Little Rock, Ark.
Memphis & Charleston	Michael Burk	A. W. Drew	Memphis, Tenn.
Memphis & Charleston	L. M. Sellars	Thomas Varun	Huntsville, Ala.
Mineral Point	Robert Hay		Mineral Point, Wis.
Mississippi & Tennessee	Henry Teague	Henry Teague	Memphis, Tenn.
Mississippi Central	Henry Gibbon	John E. Becton	Water Valley, Miss.
Maryland & Delaware	Samuel Peters		Greensboro, Md.
Mississippi, Gains. & Tus			Gainsville, Ala.
Midland Pacific			Nebraska City, Neb.
Milwaukee & St. Paul	T. S. Davis	Wm. E. Kettridge	Milwaukee, Wis.
Milwaukee & St. Paul		John Baillie	Milwaukee, Wis.
Minnesota, Iowa & Dakota Division	James Waters	D. F. Wilson	Minneapolis, Minn.
Michigan Central	A. S. Sweet, Jr	J. B. Sutherland	Detroit, Mich.
Montgomery & West-Point	J. McVey	W. H. Daniels	Montgomery, Ala.
Montgomery & Eufaula	James McCann	I. E. Holmes	Montgomery, Ala.
Mobile & Montgomery	James McFarland	L. Barham	Montgomery, Ala.
Mobile & Girard	William Eyles	A. J. Nix	Girard, Ala.
Mobile & Ohio	L. J. Fleming	John McHugh	Mobile, Ala.
Missouri River, Fort Scott & Gulf	John McCrumm		Kansas City, Mo.
Missouri, Kansas & Texas			
N			
Nashville & Chattanooga	John U. Eastman	J. G. Sawyer	Nashville, Tenn.
Nashville & Decatur	C. B. Knowles	C. B. Knowles	Nashville, Tenn.
New-Bedford & Taunton	Robert Chase	Robert Chase	New-Bedford, Mass.
New-Canaan			New-Canaan, Ct.
New-Brunswick & Canada	T. Armstrong	T. Armstrong	Saint Andrew's, N.B.
New Haven & Northampton	Henry Fox	Henry Fox	Westfield, Mass.
New-York & Oswego Midland	Wm. H. Griggs		Oneida, N. Y.
New-York & Harlem	Wm. M. Strong	Leander Garey	New-York.
New-York Central	* C. T. Ham	Joseph Jones	Albany, N. Y.
New-York Central	G. B. Van Vorst		Albany, N. Y.
New-York Central	Henry Watkeys		Syracuse, N. Y.

* Mechanical Superintendent. † General Master Mechanic.
‡ General Master Mechanic and Master Car-Builder.

* General Master Mechanic. † Mechanical Engineer.

Railroad.	*Master Mechanic.*	*Master Car-Builder.*	*Residence.*
New-York Central	Edward L. Tyler		Rochester, N. Y.
New-York Central		Wm. Johnson	Buffalo.
New-York & Flushing			Flushing, L. I.
New-York, Providence & Boston	Jas. H. Anderson	Jas. H. Anderson	Providence, R. I.
New-York & New-Haven	H. Kittendorf	M. C. Andrews	New-Haven, Ct.
New-London Northern	J. W. Dow	George Boyden	New-London, Ct.
New-Jersey & Transportation Co	John Headden	David H. Baker	Jersey City, N. J.
New-Haven & Derby			New-Haven, Ct.
New-Orleans, Opelousas & Gt. Western	John McCluskey	Matthew Nolan	Algiers, La.
New-Lisbon			Leetonia, Ohio.
New-Orleans & Ohio	John R. Jordan	John R. Jordan	Paducah, Ky.
New-Orleans, Jackson & Gt. Northern	John Conlon	Charles Bartine	New-Orleans, La.
New-Haven, Hartford & Springfield			Hartford, Ct.
Naugatuck		George W. Gray	Bridgeport, Ct.
Newark & Bloomfield	Luke F. Tronson		Hoboken, N. J.
Nova Scotia	W. Johnson		Bedford, N. S.
North-Missouri	John Calhoun	C. S. Buck	St. Louis, Mo.
North-Carolina	E. Wade	B. G. Sergeant	Co. Shops, N. C.
New-Orleans, Mobile & Chattanooga	Josiah Bettis	George Shattuck	Mobile, Ala.
Northern Central	C. M. Lewis		Baltimore, Md.
Northern Central		G. W. Demarest	York, Pa.
North-Lebanon		Henry B. Oves	Lebanon, Pa.
North-Pennsylvania	Franklin Roop	Franklin Roop	Philadelphia, Pa.
North-Eastern	D. W. Haines	A. M. Corrie	Florence, S. C.
Northern	James W. Lander	Albert Langmaid	Concord, N. H.
Northern of New-Jersey	T. W. Demarest		New-York.
Norwich & Worcester	Richard Colburn	G. R. Bentley	Norwich, Ct.
Northern of Canada	James W. Forster		Toronto, Can.
Norfolk & Petersburg	J. S. Whitworth	J. S. Whitworth	Norfolk, Va.
O			
Ogdensburg & Lake Champlain	William A. Short		Malone, N. Y.
Oswego & Syracuse	Josiah Bettis	J. H. Parker	Oswego, N. Y.
Ohio & Mississippi	George W. Harris	M. M. Martin	Cochran Shops, Ind.
Old Colony & Newport	C. F. Bullock	A. Gleason	Boston, Mass.
Orange, Alexandria & Manassas	James E. Waddy	John T. Nalls	Alexandria, Va.
Oil City & Pithole	George Thompson		Pithole, Pa.
Oil Creek & Alleghany River	J. S. McElroy	Jacob Williams	Corry, Pa.
Oil Creek & Alleghany		H.J.Bookhammer	Oil City, Pa.
P			
Panama	Thomas Cobb	J. G. Wilson	Aspinwall, N. G.
Pacific of Missouri	Jacob Johann	Jacob Johann	St Louis, Mo.
Paterson & Newark			Paterson, N. J.
Pennsylvania	* Isaac Dripps		Altoona, Pa.
Pennsylvania	H. D. Garrett	I. W. Van Houten	W. Philadelphia, Pa.
Pennsylvania	M. A. Shattuck	Samuel W. Myers	Harrisburg, Pa.
Pennsylvania	T. W. Worsdell	John P. Levan	Altoona, Pa.
Pennsylvania	D. O. Shaver	R. S. Ramsey	Pittsburg, Pa.
Philadelphia & Erie	T. J. Hamer	George J. Mason	Sunbury, Pa.
	W. L. Foster	Robt. M. Messimer	Renovo, Pa.
	W. L. Holman	Wm. P. Newcomb	Kane, Pa.
	W. T. Smith	John Quigley	Erie, Pa.
Philadelphia, Wilmington & Baltimore	George W. Perry	George W. Perry	Wilmington, Del.
Philadelphia & Reading	John Wootten	Aaron Steinbach	Reading, Pa.
Philadelphia, Germ'n & Norris'n	John Moyer	Nathan Pawling	Philadelphia, Pa.
Philadelphia & Baltimore Central	S. D. Danfield	SamuelD. Danfield	Chester, Pa.
Pittsburg, Cincinnati & St. Louis	James Ball	James Ball	Logansport, Ind.
	Robert Curtis	Theo. Chamberlain	Columbus, Ohio.
	Thomas Denmead		Dennison, Ohio.
	Thomas V. Losee	John Gottschall	Indianapolis, Ind.
		James McGee	Steubenville, Ohio.
Pittsburg, Fort Wayne & Chicago	S. M. Cummings	John Marquis	Alleghany, Pa.
Pittsburg, Fort Wayne & Chicago	J. M. Boon	Wm. Waddington	Fort Wayne, Ind.
Pittsburg & Connellsville	D. P. Rennie	J. M. Rutter	Connellsville, Pa.
Peoria, Pekin & Jacksonville	J. S. Hurd	J. S. Hurd	Pekin, Ill.
Peninsular			Battle Creek, Mich.
Portland & Rochester	Jas. S. Drake	Samuel Dean	Portland, Me.
Portland & Kennebec	John Ellis	J. W. Trussel	Augusta, Me.
Portland & Oxford Central	Geo. W. Battles	Geo. W. Battles	Buckfield, Me.
Portland, Saco & Portsmouth	John Donnell		Portland, Me.
Port Royal			Beaufort, S. C.
Port Hope, Lindsay & Beaverton	H. G. Taylor	H. G. Taylor	Port Hope, Can.
Port Huron & Lake Michigan			Port Huron, Mich.
Providence, Warren & Bristol	Rufus Smith	J. Brightman	Bristol, R. I.
Portsmouth, Gt. Falls & Monmouth	James Tucker	E. Fall	Union Village, N.H.
Petersburg	R. B. Adams	Alex. Wright	Petersburg, Va.
Providence & Worcester	Joseph Kelly	Olney L. Smith	Providence, R. I.
Peninsular R. R	T. G. Templeton		Battle Creek, Mich.
R			
Raritan & Delaware Bay	Rufus Blodgett	Rufus Blodgett	Manchester, N. J.
Raleigh & Gaston	J. B. Gayle	J. B. Gayle	Raleigh, N. C.
Rensselaer & Saratoga	W. B. Gage		Troy, N. Y.
Richmond, Fredericksburg & Potomac	H. Kuhn	W. H. Trainham	Richmond, Va.
Richmond & Danville	John McFarland	B. P. Owen	Richmond, Va.
Richmond & Petersburg	Wm. Piermont	J. J. Martin	Richmond, Va.
Richmond & York River			Richmond, Va.
Rome, Watertown & Ogdensburg	Wm. Jackson	Wm. Jackson	Rome, N. Y.
Reading & Columbia	B. Van Lew		Columbia, Pa.
Rome, Georgia	O. W. Harbin	O. W. Harbin	Rome, Ga.
Rochester & Genesee Valley	M. Wilder	M. E. Brown	Buffalo, N. Y.
Rockford, Rock Island & St. Louis	D. R. Grant		Beardstown, Ill.
Rock Island & Peoria			Rock Island, Ill.
Rutland	N. L. Davis	M. M. Crooker	Rutland, Vt.
S			
San Francisco & San José	R. B. Bishop	Frank Bellisle	San Francisco, Cal.
St. Croix & Lake Superior			New-York City.
St. Lawrence & Ottawa	Calvin Dame	Calvin Dame	Prescott, Canada.
St. Paul & Pacific	C. N. Parker, Jr	C. B. Boynton	St. Paul, Minn.
St. Louis & Iron Mountain	O. A. Haines	Oscar Doolittle	Carondelet, Mo.
Sandusky, Mans. & Newark		Charles Scoeby	Sandusky, Ohio.
St. Joseph Valley			Kalamazoo, Mich.
San Antonio & Mexican Gulf	W. T. Bingham		Victoria, Texas.
South Side of Long Island			New-York.
St. Paul & Sioux City	Jas. G. Butterfield		Shakopee, Minn.
St. Louis, Vandalia & Terre Haute	A. J. Sandborn		Effingham, Ill.
South-Carolina	W. B. Smith	John Reed	Charleston, S. C.
South-Side of Virginia	J. T. Robinett	J. T. Robinett	Petersburg, Va.
South & North Alabama	S. Schermerhorn	M. S. Riddle	Lime Station, Ala.
Southern Minnesota	Wm. Lininger	W. H. Dunham	Hokah, Minn.
South-Pacific	John Hewitt		Pacific, Mo.
South-Western of Georgia	C. D. Wall.	F. H. Alley	Macon, Ga.
South Shore	Warren E. Ray		Cohasset, Mass.
Shore Line		C. F. Platt	New-Haven, Ct.
Stanstead, Shefford & Chambly	W. H. Smith	M. Sessions	Waterloo, C. E.
Schuylkill & Susquehanna	John E. Wootten	John E. Wootten	Reading, Pa.
Selma & Meridian	John Davis	G. K. Ashley	Selma, Ala.
Seaboard & Roanoke	J. B. Pendleton	J. B. Pendleton	Portsmouth, Va.
Stonington & Providence	J. H. Henderson	J. H. Henderson	Providence, R. I.
Selma, Rome & Dalton	Geo. S. Howden	W. W. Peirce	Selma, Ala.
Sioux City & Pacific		J. R. Dow	Missouri Val., Iowa.
Spartanburg & Union	J. N. Benner	Jacob Rice	Union C. H., S. C.
Sheboygan & Fond du Lac	J. H. Erwin	J. H. Erwin	Sheboygan, Wis.
Sullivan & Erie			Tonawanda, Pa.
Syracuse & Binghamton, N. Y.	B. G. Merrill	B. G. Merrill	Syracuse, N. Y.
Sycamore & Cortland			Sycamore, Ill.

* Superintendent of Motive Power and Machinery.

Railroad.	*Master Mechanic.*	*Master Car-Builder.*	*Residence.*
T			
Taunton Branch			Taunton, Mass.
Tioga	Peres Bonny	D. H. Stratton	Blossburg, Pa
Texas & New-Orleans	R. B. Baer		Houston, Texas.
Tennessee & Pacific			Nashville, Tenn.
Terre Haute & Indianapolis	C. R. Peddle	H. Kirmse	Terre Haute, Ind.
Toledo, Wabash & Western	W. F. Ray		Fort Wayne, Ind.
Toledo, Wabash & Western	T. G. Gorman	David Hoit	Toledo, Ohio.
Toledo, Peoria & Warsaw	A. H. De Clerq	R. M. Hemphill	Peoria, Ill.
Troy & Bennington			Troy, N. Y.
Troy & Boston	Foster Church	R. V. Coon	Troy, N. Y.
U			
Union Pacific	I. H. Congdon	Geo. E. Stevens	Omaha, Nebraska.
Utica & Black River	John Bailey.	David James	Utica, N. Y.
Utica, Chenango & Susquehanna	C. H. Brown		Utica, N. Y.
V			
Virginia & Tennessee	F. Herk	I. A. Caldwell.	Lynchburg, Va.
Vicksburg & Meridian	Jas. B. Brown		Vicksburg, Miss.
Vineland			Vineland, N. J.
Vermont Central	J. M. Foss	Milton Sessions	St. Albans, Vt.
Vermont & Massachusetts	W. F. Kenney	Jacob Marsh	Fitchburg, Mass.
Vermont Valley			Rutland, Vt.
W			
Washington, Alex. & Georgetown			Washington, D. C.
Warwick Valley			Warwick, N. Y.
Wicomico & Pocomoke			Berlin, Md.
Wilmington & Manchester	George Hall	William Kinyon	Wilmington, N. C.
Wilmington, Charlotte & Rutherford	W. A. Gill	Thomas Myers	Laurenburg, N. C.
Wilmington, Columbia & Augusta			
Winchester & Potomac			Winchester, Va.
Westchester & Philadelphia	P. C. Clark	P. C. Clark	Philadelphia, Pa.
Wilmington & Weldon	John F. Devine	John F. Devine	Wilmington, N. C.
West-Jersey	W. McAllister	C. C. Williams	Camden, N. J.
Western Maryland	R. V. Dohoney	J. H. Nussear	Union Bridge, Md.
Winona & St. Peter	F. E Ford	H. L. Preston	Winona, Minn
Western North-Carolina	E. H. Marsh	E. H. Marsh	Salisbury, N. C.
Western R. R. N. C	M. W. Atkinson	M. W. Atkinson	Fayetteville, N. C.
West-Feliciana	R. C. Brower		Woodville, Miss.
Whitehall & Plattsburg			Plattsburg, N. Y.
Western & Atlantic	James Mullin	James Mullin	Atlanta, Ga.
Worcester & Nashua	George H Griggs	George H. Griggs	Worcester, Mass.
Welland	William Wells	William Pay	St. Catharine, C. W

CAR MANUFACTURERS.

Allison, W. C. & Sons	Philadelphia, Pa.
Anderson, J. R. & Co	Richmond, Va.
Altoona Manufacturing Co	Altoona. Pa.
Adrian Car Co	Adrian, Mich,
Barney & Smith Manufacturing Co	Dayton, Ohio.
Baker, Jackson & Co	Latrobe, Pa.
Billmeyer & Smalls	York, Pa.
Bradley, Osgood	Worcester, Mass.
Brill & Son	Philadelphia, Pa.
Bitner, George W	Pittsburg, Pa.
Cambridge City Car Co	Cambridge City, Ind
Canada Steam-Engine Co	Kingston.
Clendenning, W. W	Montreal.
Cummings, W. H	Jersey City, N. J.
Connellsville Machine and Car Co	Connellsville, Pa.
Detroit Car and Manufacturing Co	Detroit, Mich.
Dawson Manufacturing Co	Dawson, Ga.
Dickey, Neill & Co	Toronto.
Dickson Manufacturing Co	Scranton, Pa.
Erie Car-Works	Erie, Pa.
Elmira Car-Works	Elmira, N. Y.
Fredericks & Co	Catasauqua, Pa.
Gardner, F. & Co.	Carlisle, Pa.
Gill, John L	Columbus, Ohio.
Gilbert, Bush & Co	Troy, N. Y.
Goold, James & Co	Albany, N. Y.
Goodrich Car Co	Augusta, Ga.
Grice & Long	Trenton, N. J.
Haskell & Barker	Michigan City, Ind
Harrisburg Car Manufacturing Co	Harrisburg, Pa.
Heathcote, Herbst & Co	Glen Rock, Pa.
Hamilton, William & Son	Toronto.
Harlan, Hollingsworth & Co	Wilmington, Del.
Jackson & Sharp	Wilmington, Del.
Jackson & Woodin	Berwick, Pa.
Jones, J. M. & Co	West-Troy, N. Y.
Lombard, Thomas	Augusta, Me.
Lebanon Manufacturing Co	Lebanon, Pa.
Michigan Car Co	Detroit, Mich.
McNairy, Claflen & Co	Cleveland, Ohio.
Murray, Dougall & Co	Milton, Pa.
McVey, Walker & Co	Braddock's Field, Pa.
Meeker & Hedden	Newark, N. J.
Mowry Car and Wheel Works	Cincinnati, O.
Middletown Car & Manufacturing Co	Middletown, Pa.
Missouri Car and Foundry Co	St. Louis, Mo.
New-Haven Car Co	New-Haven, Ct.
Ohio Falls Car Co	Jeffersonville, Ind
Peabody & McDonald	Calais, Me.
Peters, Simon	Quebec.
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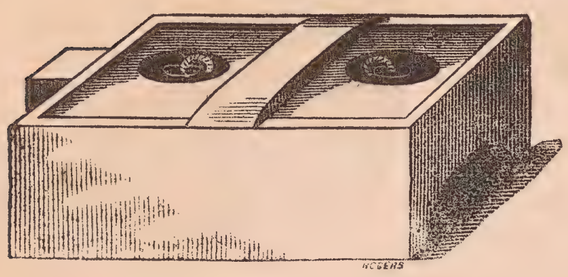

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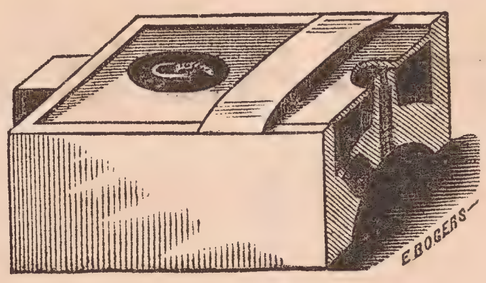

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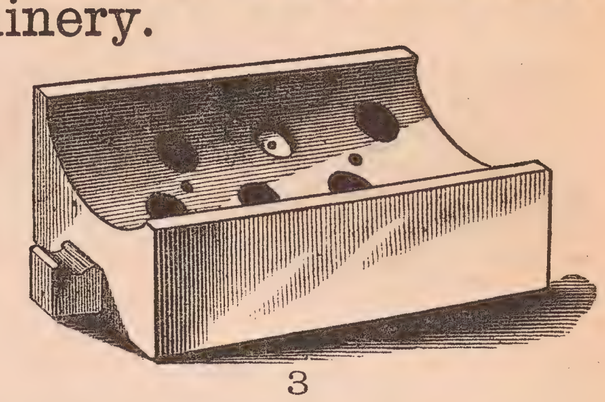

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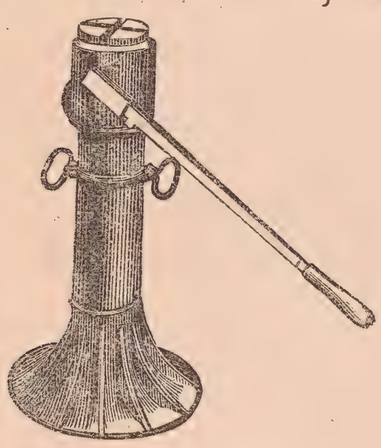

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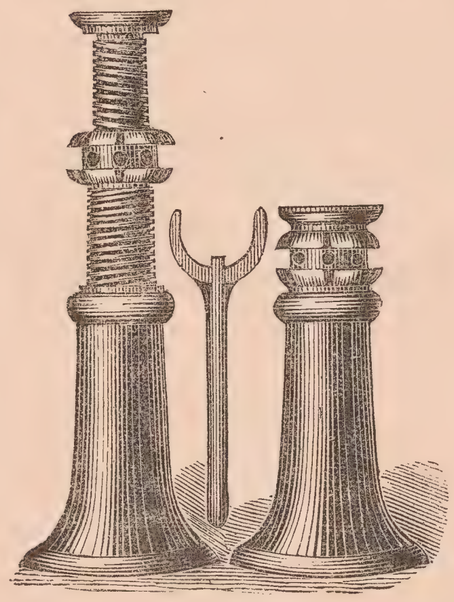

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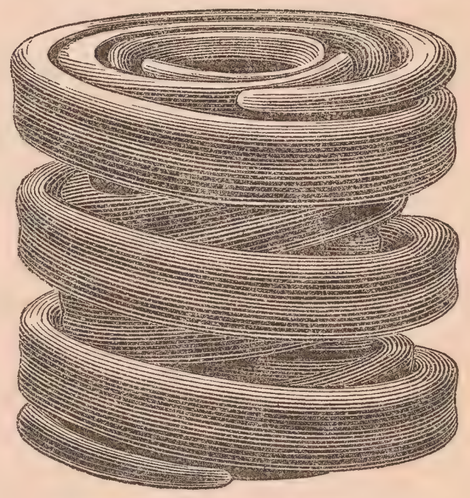

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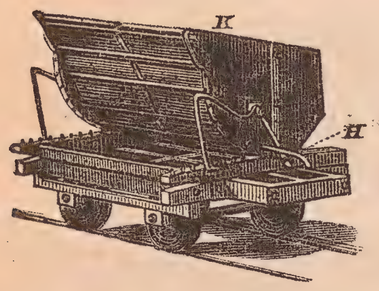

Fig. No. 1 Car Loaded and at Rest.

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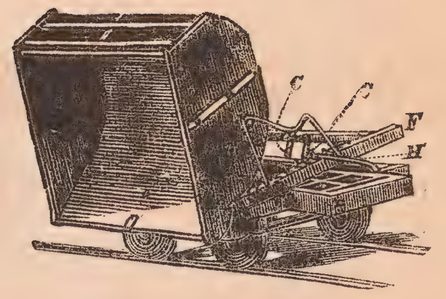

Fig. No. 2, Car Dumped.

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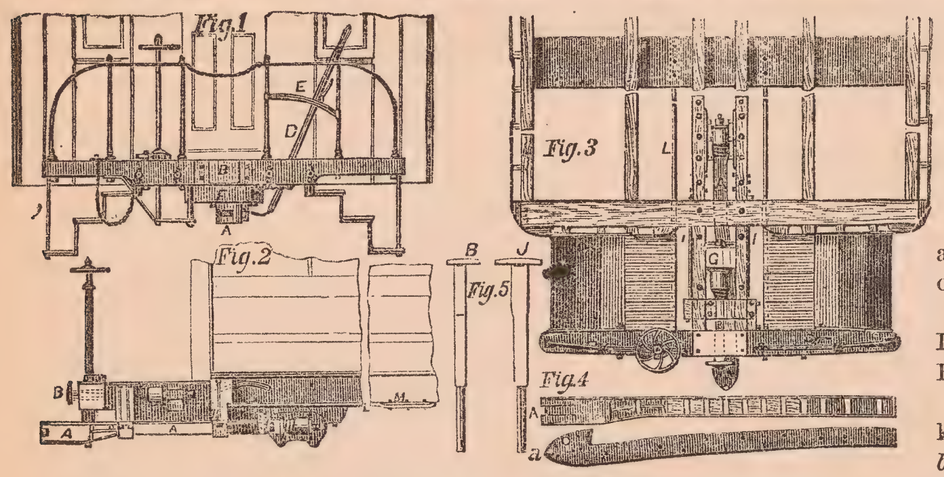

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DESCRIPTION.

Figure 1 is an elevation; Figure 2, a longitudinal section; Figure 3, a plan or an end of a car to which the arrangement has been applied; and Figures 4 and 5 show top and side views of the "Hook" and "Buffer," drawn on a larger scale than that of Figures 1, 2, and 3.

The letters refer to the same parts in all the figures. A is the coupling "Hook," B the "Buffer," C the "Stop," D the "Lever," E the "Quadrant Ratchet," F the "Truss Beam," G the "Spring Beam," H the "Suspender Beam," I the "Upward Trusses," K the "Main Spring," L the "Downward Trusses," and M the "Bolster."

The Platforms, instead of being located below the centre line of the main sills of the cars, are placed *in* that line, and held there by the Trusses I and L, so that the point of contact (in Buffers B) is *in* the said centre line and *not below* it.

The coupling "Hook" A is attached to the draw spring the same as the ordinary draw head, and at the same height above the track, but in such a manner that the outer end is free to move laterally for a short distance. The Coupling Hook projects beyond the platform. The Stop C is placed under the Buffer Beam to prevent accidental uncoupling. When two cars are brought together, the Coupling Hooks, from *their shape*, push each other aside, until the Buffers B are compressed hard on the Buffer Springs, then—*the points of the hooks having passed each other sufficiently far*—the Hooks are carried forward by their main-springs, and thus the "*Coupling*" and "*Compression*" are both effected automatically *and at the same time*, and without the use of links and pins. When two cars are thus coupled together, the *head* of the *Hook* of each car is under the Buffer Beam of its opposite car, and the platforms are close together, (about 4 inches apart.) The effect of this is, *one platform can not be forced over the other*, nor can a *child* fall between the platforms; the dust and rain are nearly all shut out; the "Compression" makes the train run steadily, and prevents all jerking at starting and stopping.

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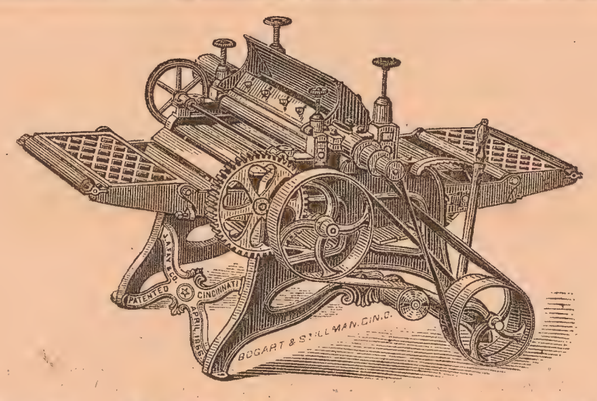

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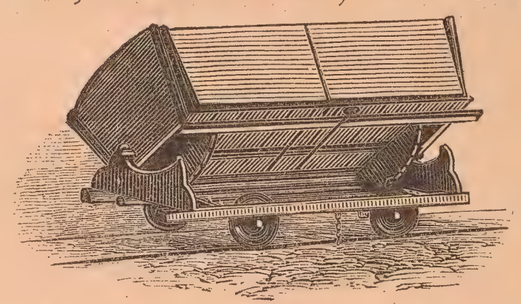

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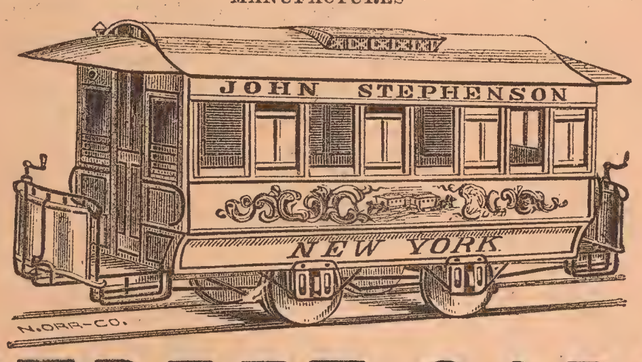

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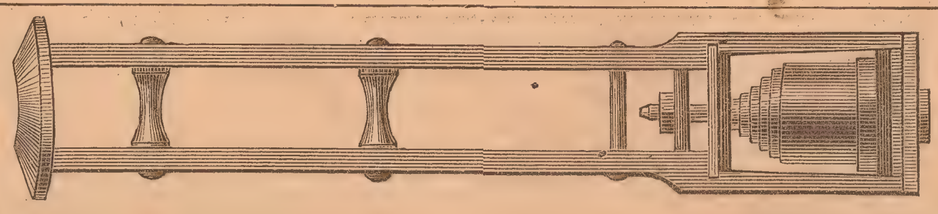

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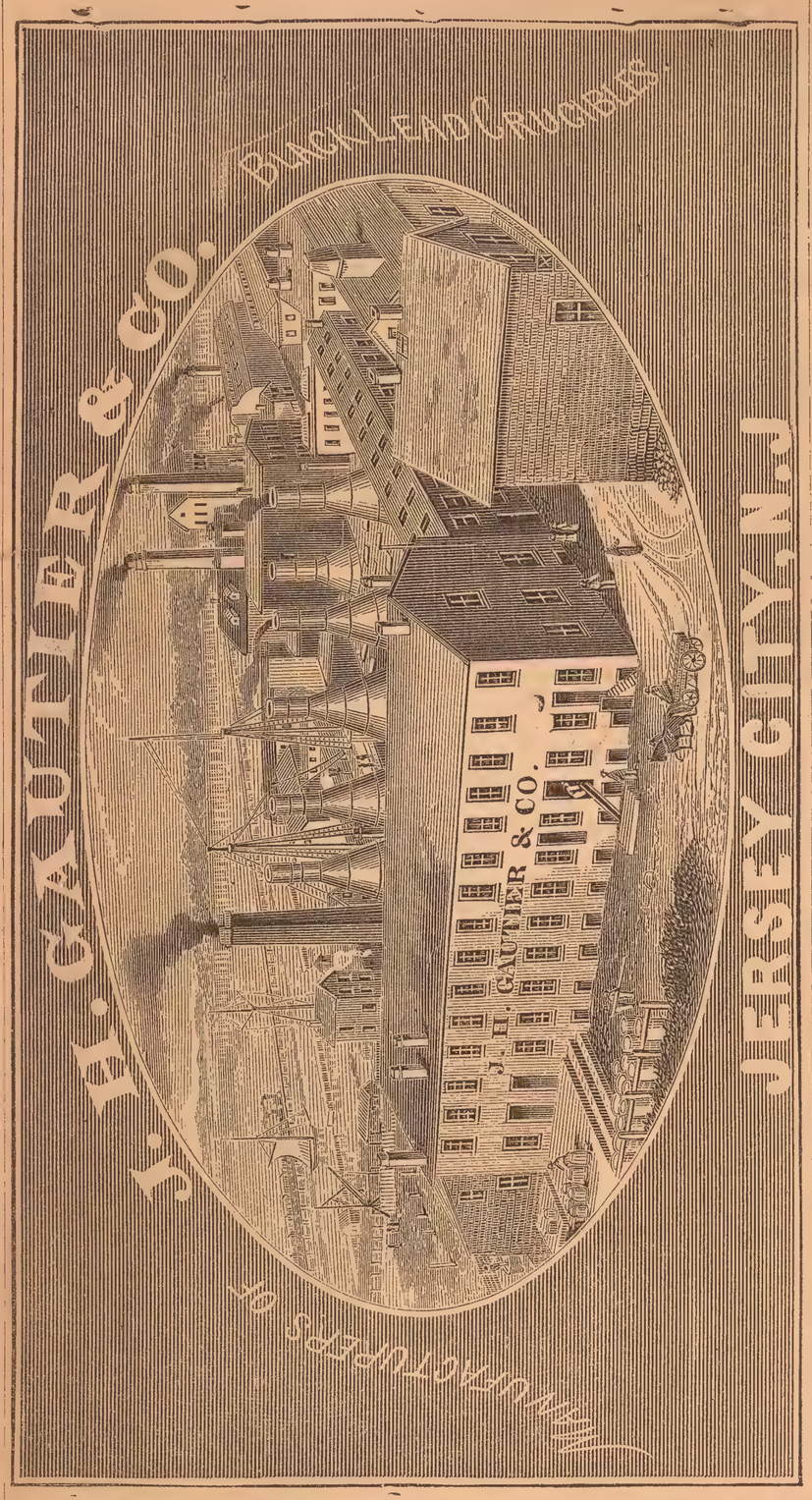

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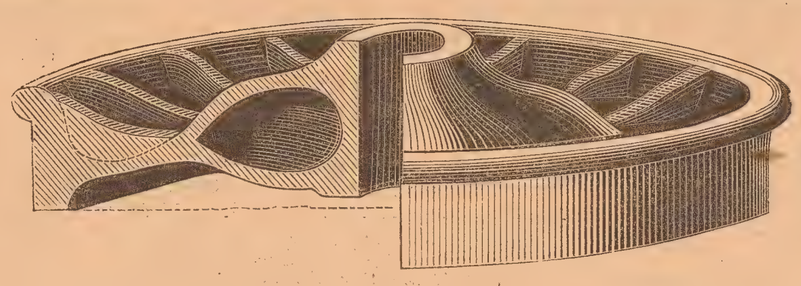

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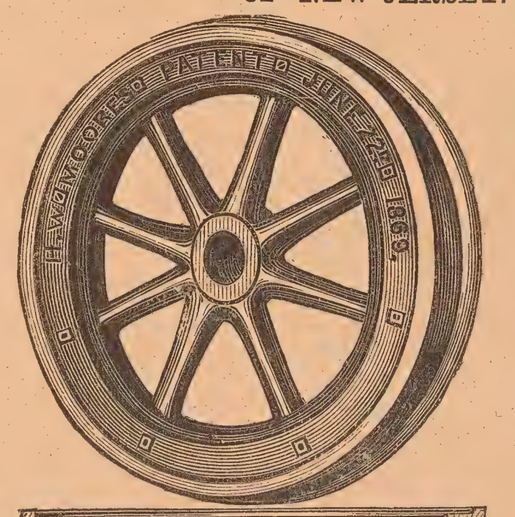

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MAY, 1871.

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Lubricators for Machinery.

It requires very little experience to teach us that very different qualities are required in the lubricators that are used for different purposes, and it will be found on examination that there are three circumstances that should guide us in making a selection of a lubricator of proper character. These are: first, the character of the work that is to be done, as, for example, whether it is light or heavy; thus, a very different lubricator is needed for heavy shafting from that which is necessary for fine work like watches, or even spindles. Secondly, the character of the surfaces in use. Thus, if a man were to use the same lubricator for fine steel journals running in metal boxes that he had found best for a cast-iron journal running in a wooden box, he would make a great mistake, and most workmen of average information know this. But they do not seem to know that cast-iron, or even coarse wrought-iron working on cast-iron, requires a very different lubricator from that used to the best advantage on hard and finely polished steel running in brass or hard gun-metal; and yet we have seen this mistake made over and over again. It is no uncommon thing to see fine oil, such as is properly used on the finest machinery, applied to heavy planers with cast-iron beds and tables, and this upon the very erroneous principle that since such oil is the most expensive it must be the best, and should therefore be applied to the most costly machines, utterly irrespective of their special characters. Thirdly, the temperature under which the machinery works has an important bearing on this subject. If the machinery should be exposed to the weather, as railroad axles, derricks, etc., a different lubricator should be used in winter from what is used in summer. Great attention is paid to this point in England, and if it pays them to attend to it in a country where the temperature is as steady as it is in Great Britain, much more will it pay us to attend to it in the United States, where the extremes of temperature are so great. In the case of journals running in a highly heated atmosphere, as is the case in some forms of the caloric engine, great difficulty is experienced in regard to this matter; but in most such cases it will be found that our dependence must be placed upon plumbago, or some similar body. A new lubricator, whose name we forget, was announced for this purpose a short time ago, but it has never come into extensive use, probably on account of its high price. It will be found, however, that plumbago, properly prepared and applied, forms one of the very best lubricators for all such purposes. These different conditions may be so combined as to give very various results, but they will in general be found to be the chief elements that submit themselves for consideration in any given case.

Where the machinery is heavy, and the bearing surfaces press against each other with great force, it is necessary to use a much harder lubricator than would be admissible under opposite circumstances. In all cases the lubricator itself, unless it be a very thin fluid, opposes some resistance to motion. In the case of a watch, the resistance of the lubricator, in the shape of thickened and gummed-up oil, often exceeds the motive power of the machine, and the motion ceases. But in the case of heavy machines, the resistance arising from this source is so small in proportion to the power employed that it is never felt, and here it is often found advantageous to harden the lubricator by chemical means. When the bearing surfaces are very soft and porous, like wood and cast-iron, it will be found advantageous to use a very hard lubricator.—*Technologist.*

New Method of Car Ventilation.

The *Oswego Advertiser* thus describes a new device called "The Ventilating Window and Spark Protector," invented by Mr. W. G. Gilbert, of the engineer department of the Midland Railroad Company: "In place of the present single-pane square window, there is a double window, which opens on either side as far as permitted by a frame above and below in the form of a bay-window. When fresh air is desired by the occupant of a seat, the half of the window toward the forward part of the train is pushed out, the other half remaining closed. Immediately an outward current is produced by the motion of the train, and the impure air passes out; but there can be no such thing as an inward draught, permitting the entrance of dust and smoke, and endangering the health of a passenger. With the windows opened in this manner, there is a perfectly free ventilation; and one passenger who may desire fresh air is not liable to promote the discomfort of others in the seats behind him, by creating a draught in opening his window. The invention has another advantage in point of safety, by obviating the careless practice of protruding heads and arms out of windows, the passenger being enabled to procure a tolerably good view forward or backward of the train from the inside of the window. The ventilating window can be attached in addition to the ordinary window, thus forming a double window, which would prove a great advantage in the winter season.

On the trip yesterday afternoon, the new ventilating window was attached to a passenger coach; and its operation was closely observed under the various circumstances presented, in rounding curves, passing through excavations, etc.; and in no instance did it fail of its purposes in the least degree. In fact, the success of the experiment entirely exceeded the expectations of several gentlemen who believed in the general utility of the invention, but apprehended that inward currents might be caused in certain conditions. The apprehension, however, proved to be entirely erroneous. The leading mechanical gentlemen of the Midland Railroad are convinced of the utility and value of Mr. Gilbert's improvement; and we presume its adoption on the road must soon follow, as well as upon all other roads, the managers of which have the comfort, safety, and convenience of the traveling public in view. The improvement will be particularly adapted to the large windows now in vogue in the construction of drawing-room cars; and it may be arranged in a manner to add greatly to the elegance of the interior finish. Mr. Gilbert has already procured a patent for his invention."

Suggestions for Improvement of Railways.

As usual after the occurrence of any severe railway accident, the recent disaster on the Hudson River Railway has showered upon us a large number of suggestions relative to the improvement of railways and their management, so as to obviate such disasters in the future. A great many of these suggestions emanate from men who have no practical knowledge of railroading, and so little theoretical knowledge as to render their suggestions of no value.

There are others, however, worth consideration. A Boston correspondent, referring to the numerous accidents which have lately occurred in depots, by passengers stepping into or off from cars in motion, thinks railroad companies are morally responsible, if not legally so, for accidents of this kind; since such accidents, resulting from carelessness or imprudence of passengers, might be prevented by a change in the construction and arrangement of platforms in the depots.

He points out the fact that the platforms are now placed so as to leave a space of about two feet between them and the cars. Persons walking along the edge of these platforms are liable to slip and fall off under the cars and be injured, and are sometimes crowded off in the rush for seats in trains.

He suggests that a uniform height for platforms in depots should be adopted, at least on the same road, and that perforated shield-plates be attached to both sides of cars, extending laterally so as to reach over and a little beyond the edges of the platforms, and joining the steps of the cars in a proper manner. Also, that shield-plates be placed between connected cars, to prevent passengers from falling between them; and that also a bridge with side railings should be placed between connected cars.

He further suggests that cars should always be coupled and uncoupled from above, instead of from the side, as is usually the case, and thinks the details of these improvements will offer little difficulty to engineering skill, and entail very little additional cost upon railway companies.—*Scientific American.*

An excellent window or glass putty may be made by boiling seven parts of linseed-oil two or three hours with four parts of ground umber, and mixing four parts of yellow wax in the heated mass. The oil is then to be removed from the fire, and while still warm is to be kneaded up with five and a half parts of finely precipitated chalk and eleven parts of ground white lead.

Street-Car Improvement.

A NOVEL mechanical device has recently been patented by an inventor of New-Orleans, La., Mr. Charles B. Broadwell, for replacing street-cars on the track in case of running off, and also to enable the cars to be moved on curves more easily than when made in the usual manner. In order to do this, the inventor provides a fifth or supplemental wheel centrally at the front of the car. This wheel is pivoted upon a vertical arbor, which may be elevated or depressed by a screw and hand-wheel on the arbor, which latter has at its upper end a crank or horizontal lever. By forcing down the arbor, the front wheels of the car are lifted, the whole weight resting on the rear pair of wheels and on the fifth wheel. By turning the latter in any direction, the front of the car may be swung in a corresponding direction to bring the front wheels over the track, which done, they are lowered thereon. In turning curves, the front wheels are lifted from the track in the same manner; the direction of the fifth or guiding-wheel being, preferably, made to run on a central grooved rail, laid for it to run upon. The same apparatus is designed to be used in running cars from one track to another, dispensing with the necessity of switches. Mr. Broadwell has assigned a half interest in his invention to Mr. Ignatius Caulfield, also of New-Orleans.

Work at the Wason Car-Shops.

THE Wason Car Company is now increasing its force, and on the first of April will commence to work eleven hours, so as to complete the contracts that it has recently made. It has just completed three elegant passenger-cars for the Rutland Railroad, the last of which went north on Conductor Carroll's train on Friday, under the charge of Mr. George C. Fisk, President of the Company, to be delivered to Governor Page, who gave out the work before the road was leased to the Vermont Central. These are of the latest style, and far excel any thing that has previously been built in New-England. The interior wood-work is veneered with curly maple, black-walnut, and mahogany. Between each window is a sunken panel, and so ornamented as to give the car a tasteful appearance. An arch which surmounts the window rests upon columns of black-walnut in bass-relief, which are finished with a pedestal and entablature of bronze of handsome design. The window-panes are of French plate glass, and the sky-lights of ground glass, bearing the monogram of the Rutland company. The head linings are tastefully designed, and the whole car is a pattern of elegance. The seats are similar to the latest designs which the company have applied to other cars, including Page's spring backs. The cars are supplied with Carroll's ventilators, which the company, after long experience, regard as the best in use. In addition to those in the roof, there are two at each end of the car, one on each side of the door. The cars are provided with an improved truck, lately introduced by the builders. By an ingenious device in suspending the car from the trucks, the usual oscillatory movement, when running at high speed, is to a great degree obviated, and thus the comfort as well as the security of the passengers materially enhanced. The cost of these cars is about $5000 each.

Including the work just completed, the company are building passenger-cars for eleven different roads, as follows: Central Railroad of New-Jersey, 6; Concord road, 2; Rutland, 3; Connecticut River, 2; Shore Line, 2; Missouri, Kansas, and Texas, 4; International of Texas, 2; Atlantic and Pacific, 3; Connecticut Valley, 6; West-Wisconsin, 7, and two sleeping-cars for the Shore Line. In addition to this, the company are building 100 freight-cars for the West-Wisconsin, and are entirely equipping the Connecticut Valley road with rolling stock, excepting locomotives. These contracts will keep the company busy for months to come.—*Springfield Telegram.*

Narrow-Gauge Cars.

A CIRCULAR recently issued by Messrs. M. Baird & Co., proprietors of the Baldwin Locomotive-Works of Philadelphia, contains the following statement of designs and comparative weights of narrow and full-gauge cars:

We subjoin, as pertinent to this subject, the following table showing the comparative proportions of dead weight to paying load of full-gauge and narrow-gauge cars:

Car.	Weight of car empty. Pounds.	Capacity. Pounds.	Weight of car loaded. Pounds.	Weight of Weight of wheels and axles. Pounds.	Weight on all the wheels. Pounds.	Weight on each wheel. Pounds.	Perc'ntg'e of dead weight to load.
Full gauge eight-wheeled box-car..	20,000	20,000	40,000	5,400	34,600	4,325	100
Narrow gauge four-wheeled box-car..	4,500	8,000	12,500	1,200	11,300	2,825	56¼
Full gauge eight-wheeled flat-car...	16,000	24,000	40,000	5,400	34,600	4,325	66⅔
Narrow gauge four-wheeled flat-car..	3,500	9,000	12,500	1,200	11,300	2,825	38 8-9
Full gauge four-wheeled coal-car..	6,600	11,000	17,600	2,300	15,300	3,825	60
Narrow gauge four-wheeled coal-car..	4,000	8,500	12,500	1,200	11,200	2,825	47

DESIGNS FOR NARROW-GAUGE CARS.

Designs for narrow-gauge freight-cars by prominent manufacturers show four-wheeled box, flat, and drop-bottom coal or ore-cars. Their weights and capacity are indicated in the above table.

For passenger service, eight-wheeled cars with flat, and drop-bottom coal or ore-cars. Their weights and capacity are indicated in the above table.

For passenger service, eight-wheeled cars with bodies 26 feet long and 6 feet wide are proposed as follows:

Second-class cars with longitudinal slatted seats in centre, (passengers to sit back to back.) Capacity, 26 passengers.

First-class passenger-cars with seats and cushions like horse-railway cars. Capacity, 30 passengers.

First-class passenger-cars with two rows of turning chairs with aisle between, etc. Capacity, 18 passengers.

First-class passenger-cars with revolving back seats, (double seat on one side of car and single seat on the other, the plan being reversed in the two ends of the car.) Capacity, 28 passengers.

All these cars have wheels about 24 inches in diameter.

Elastic Car-Wheels.

To secure a maximum of durability and smoothness of motion with a minimum wear and tear in running are the self-evident objects of a good car-wheel. That they are not very easily attained is proved by the scores of alleged improvements made in this line of invention, and the wide latitude that obtains in practice in the essential features of form and material. It not infrequently occurs that one desirable characteristic in a car-wheel is obtained at the expense of others, and consequently a wheel well adapted to some special case may not, in its success, be any proof of its utility in others.

Something like this is evidenced in the adoption, to some little extent, of elastic wheels. These, proposed when railways were in their infancy, proved comparatively useless under the exigencies of ordinary traffic in times past, but are now coming into favor for palace-cars where the reduction of jar and concussion, and increased comfort of the passengers, are more than sufficient to neutralize objections that forty years ago would have been fatal to any invention of the kind. The construction of such wheels, of course, embraces simply the interposition of some more or less elastic material somewhere between the periphery and the axle. In one wheel of the character indicated, India rubber is used, applied within the hub in the form of an annular cushion one inch thick. This must, of course, give considerable elasticity, and must deaden to a considerable degree the transmission of sound from the track to the interior of the car. On the other hand, the durability of the rubber under such conditions may very well be doubted, while the yielding of the cushion under the superincumbent weight, by keeping the axis of the axle below that of the wheel, must add to the power required in the propulsion of the car. In another wheel, also called elastic and used on some of the sleeping-coaches of the Chicago, Rock Island, and Pacific Railroad, a wooden cushion is dovetailed between the rim and a steel tire firmly fixed thereon. With less elasticity than the other just mentioned, the defects alluded to with reference to the latter must be proportionately diminished in the wooden cushioned wheel, although this more nearly approaches in character the earliest elastic wheels proposed for railway cars. The manner in which the system of cushioned wheels is now being revived is a simple illustration of the truth that in many old devices lie the germs of much that can be profitably worked out and improved under the better conditions of arts and industries in these latter times. —*American Artisan.*

Railroad Discipline.

AFTER legislators and newspaper censors have exhausted their ingenuity in devising laws for the prevention of railroad accidents, we hope that some brilliant genius will make the discovery that it is not so much new rules that are needed for the improvement of railroad management, as a more perfect system and more thorough discipline among those employed by the companies to carry existing rules into effect. Discipline among the employees in every branch of railroad service is indispensably prerequisite to the harmonious working of any system of management, whether simple or complicated, and it is only when each man knows his duty and does it with promptness and precision that the danger attending the running of railroad trains can be reduced below the present average. Considering the mischief which can be wrought by one incompetent, inefficient, or careless employee, it is a mistaken economy on the part of a railroad company to employ inferior men because their services can be had for less wages than men of intelligence and energy can command in other and pleasanter occupations. Good men, at whatever cost, must be employed to fill the minor positions on our railroads, if the safety of the traveling public is a consideration, and every infraction or violation of an established rule must be punished by the prompt suspension or dismissal of the offender. It is only upon those roads which are badly or imperfectly managed that travel is attended with any extraordinary degree of danger; and when the public shall learn to discriminate against such roads, the evils resulting from a want of better and more thorough discipline will promptly correct themselves.

MR. J. H. KEITH has been appointed Master Mechanic of the Cincinnati and Indianapolis Junction Railroad Company, in place of Mr. O. H. P. Little, resigned.

IN Spain, railways are prohibited by statute from running cars or carriages at a faster rate than fifteen miles an hour.

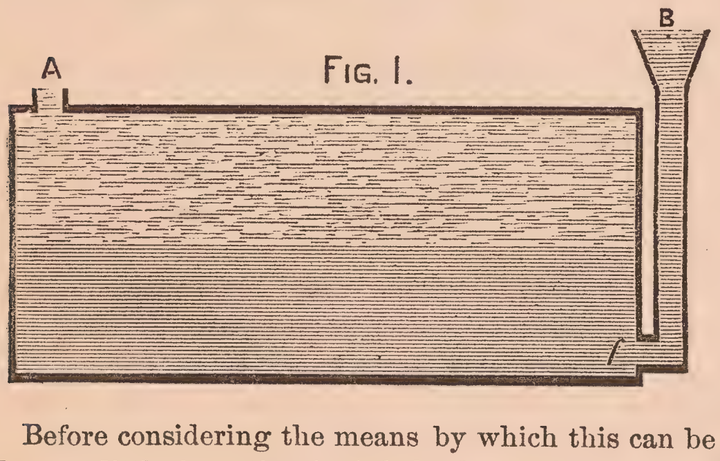
Warming and Ventilation of Railroad Cars.

CONTINUED.

It is still in dispute whether the human breath as it leaves the body will rise or fall in a calm atmosphere of a temperature of 70°. Some of the best authorities on the subject of ventilation differ in regard to this question. Plans for ventilating houses and railroad cars have been devised on each hypothesis.

A common idea is, that the expired air, being warmer than the surrounding atmosphere, therefore rises. Another is, that the greater specific gravity of the carbonic acid causes it alone, or in combination with the air which has passed through the lungs, to fall. There is no evidence to indicate that the carbonic acid combined with expired air separates from it, unless it remains perfectly calm for a considerable time; and even then it is doubtful whether they separate when once mixed, excepting by absorption. It is therefore not a question whether any one of the products of respiration, but whether the entire expired matter, composed of all of them combined with the air as it leaves the lungs, is heavier or lighter than the surrounding atmosphere. If the expired air is so light as to rise just as soon as it leaves the lungs, then, of course, it should be exhausted at the top of the room or car; if, on the contrary, it falls, it should be removed to the floor. The difference of opinion which exists in relation to this point has occasioned much dispute and confusion in the science and practice of ventilation. With the knowledge now within our reach, it is impossible to say with certainty which is the true theory. The diversity of opinion which exists in relation to it makes it probable that the difference in the specific gravity of ordinary air at a temperature of 70° and that which is expired is very slight. If it were otherwise, no such difference of opinion would probably exist. Ordinary observation with the smoke of a cigar shows that the breath mingled with the smoke moves very slowly, unless impelled by some current of air, and is very soon diffused equally through the whole room, if the air is not perfectly calm. The same is doubtless true of the breath. In railroad cars, the motion of the car itself, and the frequent passing to and fro of persons going in and out of the car, will cause a sufficient disturbance of the air to prevent the breath from settling to the floor or rising to the roof. At any rate, a little observation with cigar-smoke will show that the expired breath will not move *against* a current of air; therefore, if we can produce a downward motion of the air, *the breath will not rise,* but descend. If, on the other hand, the atmosphere in the car moves in an ascending current, *the breath will not fall.*

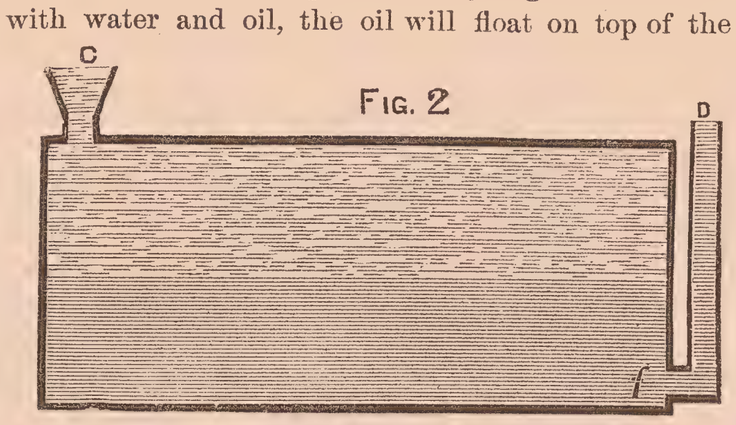
As a constant supply of air *must* be introduced into a car, and the same quantity be exhausted, a current of some kind must be maintained. If, therefore, we can cause this current to pass through every part of a car, it will be sure to carry with it all the products of respiration and other exhalations from the human body. As the whole car is at times filled with people, if the air in any part of it becomes stagnant, it will also become impure. Our problem then is, *how to supply* 1000 *cubic feet of fresh warmed air per minute, and diffuse it equally through the whole car.*



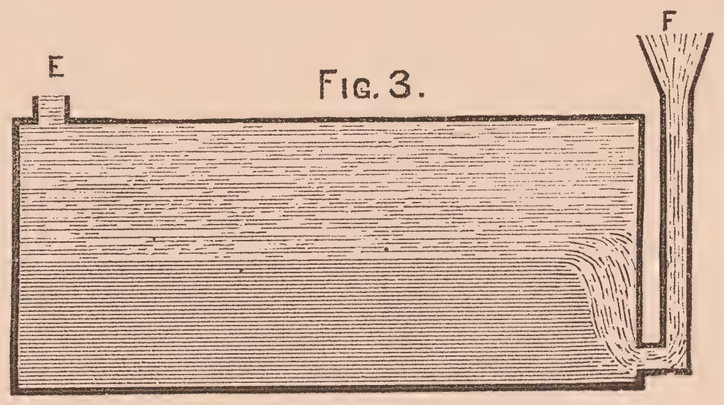
Before considering the means by which this can be done, a little investigation of the laws which control the motion of the air will be necessary.

Warmed air, being lighter than cold, will rise to the top, in any apartment into which it is introduced; or if cold air is brought into a room filled with that which is warm, it will immediately fall to the floor.

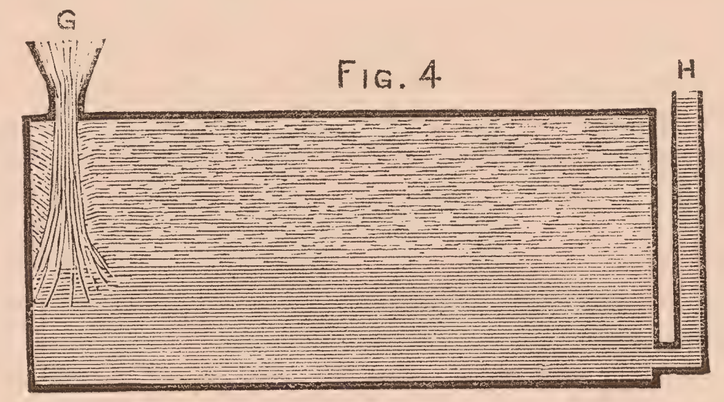
If, as an illustration, we take a vessel of any form—say similar to that represented by Fig. 1—and fill it with water and oil, the oil will float on top of the



water, as shown in the engraving, the broken lines representing the oil and the full lines the water. If now we pour more water into the tube *B,* which connects with the bottom of the vessel, then the oil will flow out at *A,* and the water will gradually rise and displace the oil. If, on the other hand, we should pour oil into the vessel (Fig. 2) at *C,* then the water would flow out at *D,** and if enough oil is poured in, the



water in the vessel will all be displaced by the oil. If we pour oil into the tube *F,* (Fig. 3,) it will at once rise above the water as soon as it enters the vessel and will displace a corresponding quantity of oil, which will flow out at *E.* If, instead of pouring water into the tube which connects with the bottom of the vessel, we pour it into the orifice at the top, (*G,* Fig. 4,) it will at once sink to the bottom and cause a quantity of water to flow out at *H.* It will be impossible to make



the water flow out at the top of the vessel so long as there is any oil in it, or make oil pass out through the tube which connects at the bottom while the level of the water is above the opening at *f, f,* (Figs. 1 and 2.) It will also be equally impossible to keep the water at the top of the vessel or the oil at the bottom. The one will rise to the top just as certainly as a cork will float; and the water will sink to the bottom as surely as a stone will when thrown into a pond.

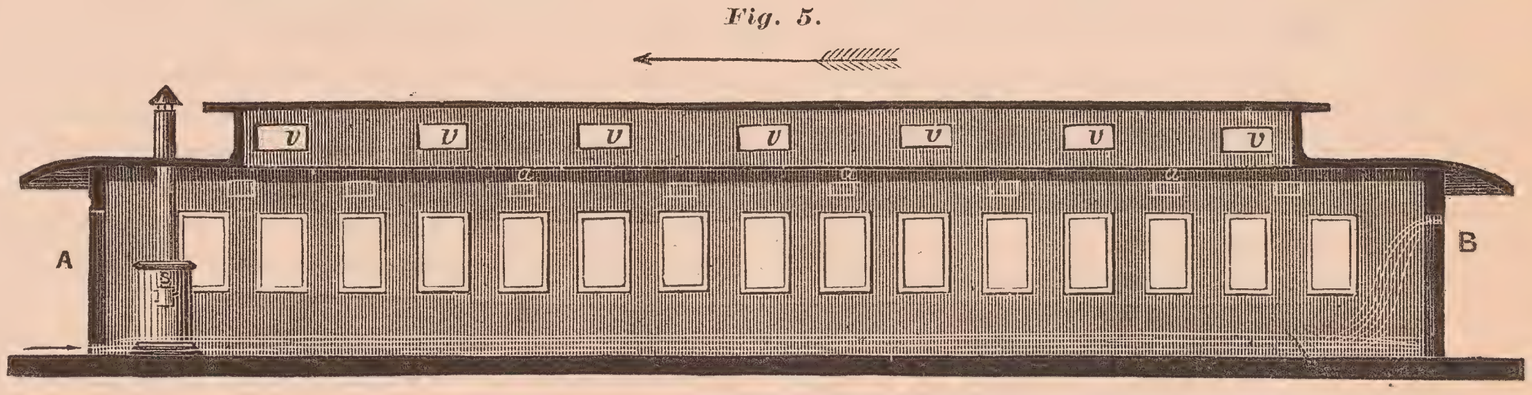
If instead of water and oil we substitute cold and hot air in the vessels described, we shall have almost an exact representation of the relations the latter will bear to each other under the same conditions. The cold air, being the heavier, will fall to the floor, and the hot air, being lighter, will rise to the top, just as surely as do the water and oil. If the vessel contains both warm and cold air, then that which escapes from the top will be warm, and that exhausted from the bottom will be cold. No matter where the hot air is introduced, or at what point the cold air is supplied, they will inevitably each find their place, one above and the other below, and they will occupy the same relative position in any apartment, such as an ordinary room or car. Fig. 5 represents a car with an opening under the door *A.* If the train is running in the direction of the dart, the cold air will rush in under the door, and will lie in a cold stratum the whole length of the car, as shown by the white lines. As it enters, it will displace the same quantity of air, which will escape by the ventilators, if they are open, or by any other aperture or crevices through which it can pass. If the opening, instead of being at the bottom of the door, is at the top, as shown at *B,* then, if the train should run the reverse direction to that shown by the dart, the cold air will rush in, and as soon as it enters will fall to the floor like a cascade, whose descent will be more or less sudden according to the force with which it is injected into the car. The same effect will take place if the air enters through openings *a a* in the sides of the car, where they are often placed. It is true that the stove *S* will gradually warm some of the cold air, which will then rise; but unless the opening which admits the air is closed, there will be a continued supply to maintain the cold stratum on the floor. The following experiments were tried by the writer to learn what the temperature at the roof and floor of a car ordinarily is in cold weather. The first three were tried on the Pittsburg and Cleveland, the others on the Philadelphia, Wilmington, and Baltimore Railroad:

Temperature at roof of car.....	72°	90°	72°	87°	80°
" half-way up.....	65	62	54	..	..
" at floor.....	53	47	46	58	55
" outside.....	8	8	8	..	..

The Pittsburg and Cleveland car in which the experiments were tried had five very powerful exhaust ventilators in the roof, which were so arranged that they could not be closed. The weather the day the last two experiments were tried was ten or twelve degrees warmer than the day those on the Cleveland and Pittsburg road were made. From personal experience, the writer is satisfied that a difference of 50° in the temperature of the air in the bottom and top of cars is not uncommon in cold weather, when they are heated by ordinary stoves. Of course the hot air escapes through the ventilators *v, v, v,* when they are open and there is any aperture through which air can enter the car to take the place of that which is exhausted. We therefore have the curious anomaly, which is very common, of attempting to heat a car by *admitting cold air* and *exhausting that which is warm.*—*Chicago Railroad Gazette.*

A SURPRISING effect is produced in the operation of burning powdered coal in several English furnaces owned by a gentleman named Crompton. The method was devised for the purpose of economizing fuel, and to save from loss the immense quantity of small coal wasted; and it consists in blowing the powdered coal into the furnace, and exactly the quantity of air requisite to effect complete combustion. A mass of flame of the highest temperature thus fills the furnace, and does its work without producing any smoke whatever.

Fig. 5.



* The mouth-piece *C* must in this case be sufficiently high that the column of oil it contains will overcome the difference between the specific gravity of the water and oil.

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VOSE, DINSMORE & CO.,

1 Barclay Street, New-York,

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Editorial Announcements.

Correspondence.—*We cordially invite the coöperation of the railroad public in affording us the material for a good mechanical paper. Articles relating to rolling stock and machinery, by those practically acquainted with those subjects, will be gratefully received. All communications must be addressed to Vose, Dinsmore & Co., No.* 1 *Barclay Street.*

The name and address of the writer must accompany all communications designed for publication.

Advertising Rates.—*For one square, or one fifth of a column,* $5 *per month, or* $50 *a year. For half a square,* $3 *per month, or* $25 *a year. Larger advertisements by special contract.*

All communications in regard to advertising should be addressed to L. F. Dinsmore, *Post-Office Box* 4055, *New-York City, who is our agent for advertising, and authorized to make contracts, collections, etc.*

Engravings and Illustrations.

We would invite the attention of Master Car-Builders and others to the advantages to be derived from publishing in The National Car-Builder *engravings designed to illustrate the various features and details of car construction, and especially such improvements as can not otherwise be clearly presented. We will procure cuts to be made in the best manner from drawings or models that may be sent us, and charge only for the cost of engraving, inserting the same in our paper with suitable descriptive details, without charge. The cuts thus made by us, or that may be sent us for use in* The National Car-Builder, *will of course be returned promptly to the owner.*

Master Car-Builders' Association.

In pursuance of a resolution adopted by this association at its last annual convention, designating the time and place of meeting for the current year, the undersigned hereby give notice that such meeting will be held on Wednesday, the 14th day of June next, at ten o'clock A.M., at the Exchange Hotel, in the city of Richmond, Va. As business of importance will be presented for its action, it is desirable that there should be a full attendance of the members of the association. Presidents and superintendents of railroads, and contracting car-builders, are invited to be present and occupy seats in the convention.

F. D. Adams, *President.*

Leander Garey, *Secretary.*

New-York, April, 1871.

It is hardly necessary for us to call the attention of master car-builders throughout the country to the above notice of the time and place of meeting of their fifth annual convention. We trust every member of the association appreciates the importance of a full attendance, in view of the many subjects of interest which will demand their action. The several committees appointed at the last annual meeting, to take charge of special topics pertaining to the details of car-construction, will doubtless be prepared to report. The range of topics embraced in these reports, in connection with other business that will require attention, will be sufficient to occupy the time of the convention for several days.

Safety, Speed, and Comfort.

The Patent-Office Reports for the past fifteen or twenty years show that a very considerable proportion of the inventions protected during that time by letters-patent have pertained, directly or indirectly, to American railways. This subject of quick transit between points widely separated, in our vast extent of territory, is one to which the minds of our best inventors have been continually directed in attempts to realize the familiar railway motto of "Safety, Speed, and Comfort." Inventors have naturally, and very wisely, looked upon this matter of railway improvements as a mine of never-ending wealth to the fruitful and persevering mind. The immense resources of railroad corporations render their managers abundantly able to pay largely for such improvements or inventions as possess the merit of enhancing the value or popularity of their roads, or which will enable them to lessen the expenditure of money, labor, or time in general operations.

Yet, how small a minority of these numberless inventions have been adopted by railways, and how very few of these even are now popular with railroad men, as answering perfectly the ends for which they were designed! The inventors who have realized any considerable sums, as the result of their ingenuity and labor, may be easily numbered. They are few and far between in the ranks of the competitors whose names are inscribed upon the rolls of the Patent-Office.

And to-day, railway managers are exceedingly loth to listen to the appeals and representations of inventors, who call for the adoption of their various improvements and alleged discoveries. Inventors, some of them, perhaps, holding really valuable patents, are daily learning the sad lesson of disappointments, oft repeated, as they turn away unnoticed and unheard from the doors of the great railway office.

What has brought about this state of affairs? Why is it that men of that class, whose activity and fertility of mind have really done so much by their inventions and discoveries to bring American railways up to their present high position, are now passed by without recognition when they bring forward fresh evidences of continued zeal and ingenuity? We think the reason lies in the fact that so many of the inventions which have been adopted and put in operation by railway corporations, during the past five or ten years, have failed to fulfill the predictions of their originators or to meet the test of entire reliability and certainty under all circumstances. This failure of the many has caused a distrust of the whole range of patented inventions, which has grown steadily into an absolute prejudice. Nor is this prejudice without good grounds for its development. Take the single matter of heating railway carriages. What real progress has been made in this direction? Various heaters have been invented and put in operation at a heavy expenditure of money by railway managers. Steam-heating, especially, has been tried, and perhaps with better results than those secured under any other method. And yet how frequently these heaters fail to give satisfaction when their best action is most needed!

The ventilation of railway carriages is another subject which, perhaps more than any other, has employed the minds of inventors. Endless varieties of plans and methods have been suggested, and many have been tried. Yet who has ever ridden in a well or even indifferently ventilated car? To roast and stifle, or to freeze and shiver, are the alternatives to winter travelers; while an abundance of carbonic acid, or a superabundance of smoke, cinders, and dust, are the only choice during the summer solstice.

A reliable and readily operated safety-brake has yet to be produced. Hundreds of devices of this description are now in use, and yet how frequently do they fail to avert calamities for the prevention of which they were designed and adopted!

Here are three problems of great importance in railway rolling stock, which the industrious inventor has yet to solve. When cars are *heated, ventilated,* and provided with a perfect *safety-brake,* then safety, speed, and comfort are assured; but not till then. Our railway palaces lack nothing else. In every other requisite they are perfection. They possess beauty of decoration, sumptuousness of arrangement, and convenience of details.

We think the failure of the multitude of inventions which have been produced with the aim of effecting the reforms needed in railway architecture, is due to the fact that too much dependence has been placed upon unreliable and frequently ineffective mechanical agents in the practical operation of such inventions. To render any device entirely reliable in every possible emergency, the parts of which it is composed must be simple and substantial, while the agents upon which its efficient working depends must necessarily be powerful, when power is required, and immediately accessible. A liability to get out of order has been the great point of failure with the majority of these devices. This arises mainly from too complicated mechanism, while the lack of ready and efficient agents in the moment of demand for their use, has again and again rendered those inventions which depend upon rapidity of operation for efficiency, such as brakes, worse than useless, and they have not infrequently augmented the disaster and loss of life which they were especially designed to avert.

Let inventors, then, avail themselves of only thoroughly efficient mechanism and agencies of action, casting aside every possible device that will not stand the test of entire reliability under the most untoward circumstances. Let them do this, and inventions which shall point to the removal of the varied discomforts and dangers of railway travel will gain the reward of speedy adoption, liberal remuneration, and the blessings of their fellow-men who "travel by night and by day."

Steel and Rubber-Belting.

We have been shown several specimens of machine belting which, in our judgment, is a great improvement upon any of the kinds now in use. Mr. Louis Sterne, of London, is the inventor and patentee. The materials of which it is made are steel and rubber, so combined as to make available to the fullest extent the strength of the one, and the adhesive properties of the other. Belts of any size and capacity can be made by this method. The specimens referred to are about four inches in width. In the centre is a thin plate of steel, twenty-four gauge, to both sides of which, as well as the edges, the rubber is united by a peculiar process while it is being vulcanized; and so complete and thorough is the union of the two materials, that the rubber can not be separated from the steel in any other way than by cutting or tearing it off. The superior qualities of such a belt, and the many advantages resulting from its use, must be manifest to every machinist. The ordinary leather or rubber-belting of the best material and quality is liable to stretch, and invariably does stretch more or less, owing to the lack of that element which is in this case supplied by the steel. The metallic centre prevents any elongation. There is no liability to slack or run off, and consequently no time is lost in taking up a belt of this description. It is not affected by moisture or by changes of temperature; and when one side is sufficiently worn, it can be turned, and the other side will wear equally long, being practically two belts in one. We are assured by the inventor that it has been thoroughly tested, and that specimens can be produced that have been in constant use for a year without any perceptible wear. The ends are fastened by two clips with set-screws, without making any holes through it.

Every mechanic is aware how important is the proper management of belting as a method of transmitting power. If the adhesion to the pulley is too great or too little, or if there is a disproportion between the adhesion and the tensile strength of the belt, power is wasted or time lost from running off,

breakage, taking up, or other mishap. If, however, the belt is made of such materials as to secure the requisite friction in proportion to its strength, and if it be properly and carefully adjusted, there is no more simple or economical mode of communicating power to machinery. When fifty hands, for example, are dependent on a driving-belt running on a main shaft, half an hour lost in repairing is equivalent to twenty-five working hours, or two days and a half. It is easy to calculate how much each half-hour's stop will cost on the basis of wages paid, and how many such stops saved will pay for a good belt. We think the invention of Mr. Sterne is worthy the attention of mechanics in this country as well as in England, where it has been already extensively introduced. Specimens may be seen at the office of Vose, Dinsmore & Co., No. 1 Barclay street, who are the sole agents for the United States.

Elmira Car-Works.

THESE works are situated at Elmira, Chemung County, N. Y., on the line of the Erie Railroad. They were established in 1851, by Mr. William E. Rutter, as a repair shop for the accommodation of what was then the New-York and Erie Railroad. In the year following, the capacity of the works was increased, and the construction and repair of cars of various kinds was continued by Mr. Rutter until 1858, when his interest in the property was purchased by the road, he being retained as superintendent of car repairs. The shops have been twice burnt and rebuilt, once during the ownership of Mr. Rutter, and again in 1862.

On the first of December last, the works, including machinery, fixtures, and grounds, were leased for a term of years to the Erie and Atlantic Sleeping-Coach Company, by whom they are now operated under the direction and management of William R. Barr, as President, and William E. Rutter, as Superintendent.

The shop proper covers about one and a half acres of ground, the main building being 300 feet long by 75 feet wide, with an extension of 150 by 51 feet occupied as a paint-shop. In addition to these, there is another building used for upholstering. All are of brick, and constructed in a substantial manner, affording working room in all the departments for 300 men. The entire structure is well lighted by large windows in the sides and roof, and every precaution is taken to guard against a repetition of the previous accidents from fire. A good supply of hydrants, hose, and buckets is provided, and a vigilant watch kept day and night. The present force consists of a little more than a hundred employees in the various departments; but when the works are running to their full capacity, double this number is employed, and fifty day passenger-coaches a year can be turned out ready for the track.

The Erie and Atlantic Sleeping-Coach Company have contracted to supply the Erie Railway with a large number of day passenger-coaches, four of which have already been delivered, and upon the residue a large force is soon to be employed. The passenger and freight-cars turned out by these works, in all the essentials of good rolling-stock, will compare favorably with any to be found on our roads.

The long experience of Mr. Rutter in this branch of railway equipment has made him widely and favorably known among car-builders, and the work turned out under his superintendence always exhibits good taste, well selected materials, mechanical skill, and the latest and most approved devices in the details of construction.

CHRISTIAN STOLZ has resigned his position as Superintendent of the Wyoming Division of the Lehigh Valley Railroad, and Alexander Mitchel has been appointed to fill the vacancy.

THE Memphis and Little Rock Railroad has been completed, and will soon be open for business.

Correspondence.

Steel Tires.

MESSRS. VOSE, DINSMORE & CO.:

DEAR SIRS: The question has frequently been asked, "Is steel tire for locomotives economical?" I do not think there is a master mechanic on any railroad that will answer in the negative, or who has any doubts of their practical utility. The first steel tire used on the New-York Central Railroad was of the Vicker manufacture, and was put on four locomotives in 1864. They are now in use, and are one and a half inches thick. At the present time, we have on the New-York Central division of the New-York Central and Hudson River Railroad, 220 locomotives, with steel tires of the following manufacture: Vicker, Krupp, Firth, (of the Nashua Iron Company,) and Petin, Gaudet & Co., (French.) Of the latter manufacture, we have about 500 tires. With the required amount of shrinkage, there is no danger of breakage. We have not broken one during the past winter, and only one since they have been in use on our road. The life of the best iron tire is about two years, while that of the best steel tire is about six years, thus showing a large saving to railroad companies in the use of the steel instead of iron. Another question has been asked, "How thin is it safe to run steel tires?" My experience has been that it is safe to run them as thin as the best iron tire, provided they are not allowed too much shrinkage when first put on.

Respectfully yours, C. T. HAM,
Chief Engineer New-York Central Railroad.

ALBANY, April 15, 1871.

LOUISVILLE, KY., April 21, 1871.

EDITOR OF THE NATIONAL CAR-BUILDER:

DEAR SIR: I venture to send you a few hastily-written notes in regard to railroad matters in this city and vicinity. A healthy activity is manifest in all the various departments of repair and equipment, and the extent and magnitude of the shops and works are constantly on the increase. The mechanical department of the Louisville, Cincinnati, and Lexington Railroad is located here, and is under the direction of Theodore G. Shaw, M. C. B. The shops of this road were destroyed by fire a few weeks since, causing considerable loss to the company; but the damage is being speedily repaired. The construction of new car-shops has been commenced, and, when completed, they will be in all respects creditable to the energy and enterprise of the company. The gauge of their road will soon be changed from five feet to four feet nine and a quarter inches, which will be uniform with that of the roads north of the Ohio River; and when the new bridge is completed at Cincinnati, the cars of northern roads can be run over their track, which will materially enhance its business traffic. The machine department is under the direction of Mr. John Skidmore.

The works of the Ohio Falls Car Company are located at Jeffersonville, opposite this city, on the Indiana side of the Ohio River. They are at present very busy executing orders for passenger and freight-cars, the skill and experience of the company, acquired during the many years they have been in successful operation, having established a reputation for turning out good work that is widely recognized. Joseph W. Sprague is President of the Company, and W. Crichton, Jr., Secretary and Treasurer. F. D. Adams, President of the Master Car-Builders' Association, and at present connected with the Boston and Albany Railroad, was formerly superintendent of the works, and his practical skill in his vocation, and estimable personal qualities, have secured for him many warm friends in this locality.

The shops of the Louisville and Nashville Railroad are in this city, and are under the superintendence of Mr. Thatcher Perkins, who was for many years connected with the machinery department of the Baltimore and Ohio Railroad, and subsequently Superintendent of the Pittsburg Locomotive-Works. As a practical machinist and mechanic, and an inventor of valuable improvements in mechanism, he stands deservedly at the head of his profession. Since he has filled his present position, he has put the machinery of the road and its branches in first-class condition, constructed eleven locomotives of superior beauty and finish, and placed the car-shops on a footing that enables them to repair all the machinery and turn out all car-work required by the company. Some six hundred workmen are employed in the various departments. Mr. Thomas Welch has charge of the locomotive repair and construction department; Mr. Isaac Owens, of the car department; Mr. George P. Miller, of the foundry department; Mr. Samuel Smith, of the paint-shop; and Mr. Robert Weaver, of the smith-shop.

The artistic designs of Mr. Smith for the interior decoration of passenger-cars, in the way of scene-painting and ornamental glass for windows and doors, are elaborate and beautiful, and display more than ordinary excellence. The cabinet work is of a superior quality, and is made by Mr. G. Kitely, whose skill in this branch of car equipment can hardly be surpassed.

The works of this road have been gradually increasing until they have attained their present proportions. The buildings are of the most substantial kind, and are replete with every convenience, being well lighted and ventilated, and in all respects admirably suited to the purpose designed.

MORE ANON.

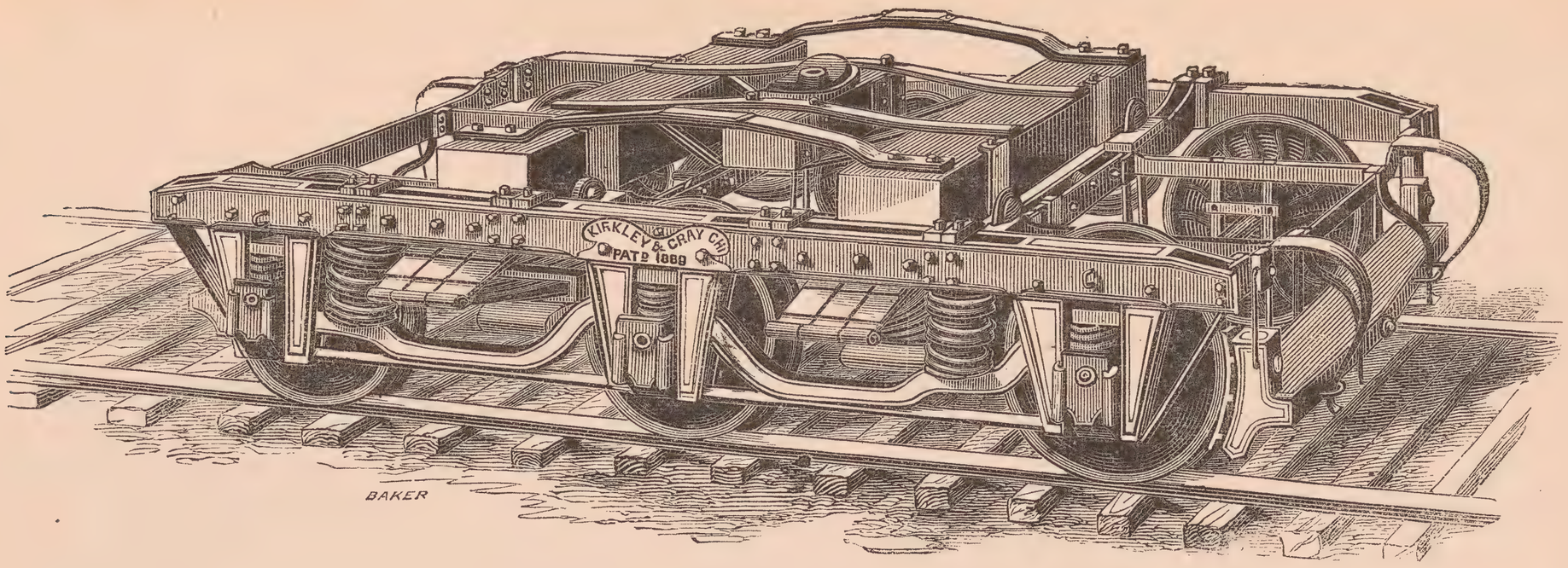
Commodore Vanderbilt's Car

Is thus described by the Albany *Times*:

"A coach known as the 'Directors' Car,' built especially for Commodore Vanderbilt, is very nearly completed. It is a few feet shorter than an ordinary coach, and will be one of the most cosy cars ever built. The body of the car outside is of a cream color, with cornices of a darker shade, and presents a decidedly handsome appearance. One light of the best French plate-glass constitutes a window, the centre plates being 42 × 36 inches. There is nothing gaudy or showy about the coach. The inside wood-work is of black-walnut, and finished as finely as possible. The decorations are elegant. The mountings, door-knobs, hat-racks, lamp finishings, etc., are all heavy silver-plated. The car is divided into three compartments. The main room is 9 × 25 feet; a private parlor about 8 feet square, and a sleeping apartment. At one end of the car are two closets, one of which is furnished with refrigerator, etc., and both have all the latest improvements. The car will be lighted from six elegant lamp-brackets, in which, however, sperm candles will be used, the commodore preferring them to gas. The upholstering is not yet finished. The platform has neat, strong iron railings about it, provided with drop-gates at either side; so that when desired, it can be surrounded with an iron-work fence about 2½ feet high. It was the commodore's orders not to let the car be publicly shown—and of course his wishes have been gratified."

A NUMBER of rotary puddlers have for some time been in successful operation at the Cincinnati Railway Iron-Works, and have attracted considerable local attention. The machine puddlers dispense with the hand labor of the usual furnaces, performing the same duty by steam power. Those at present in operation are making puddled balls of from 650 to 700 pounds in weight; and others of greater capacity are in process of construction. Samuel Danks, of that city, is the inventor.

THE Barney & Smith Manufacturing Co., of Dayton, Ohio, are about completing a new foundry which will enable them to turn out 150 car-wheels per day.



Kirkley & Gray's Wrought-Iron Truck.

Kirkley & Gray's Wrought-Iron Truck.

THE engraving illustrates Messrs. Kirkley & Gray's iron truck, patented 2d February, 1869, constructed entirely of wrought-iron.

The frame is composed of thin strips of bars, so arranged that all the vertical stress is supported by the depth of the bars, the requisite stiffness laterally being secured by the transverse ties between the girders. Each one of the longitudinal girders is, as may be seen, composed of two thin strips, secured by bolts and ferrules, or spacing-tubes, which serve the double purpose of stiffening the girder and forming a bearing for making rigid connections, which will prevent the bars from yielding under lateral strain.

It is worthy of note that the girder is considerably stiffened by its connection with the pedestal, the upper portion of the pedestal being reduced and inserted between the bars and bolted; also, that the bars are joined at the corners of the frame in a remarkably simple and effectual manner. The illustration shows a form of six-wheel truck, though it will be seen that there are none of its peculiarities which are not equally adaptable to frames for either four or eight wheels. It will be apparent in this matter that all the considerations which in bridge construction argue so convincingly in favor of the exclusive use of iron, apply with equal force to the construction of car-trucks. The same ends, durability and economy in weight and space, are to be secured; while the cost is little if any more than the wooden truck.

These trucks are in use on the Chicago and North-Western Railroad, and are also running under a number of Pullman cars. Communications may be addressed to Messrs. McGregor, Atkinson & Co., 128 Lake street, Chicago, who are prepared to furnish them to order, or to negotiate with roads desiring to use and manufacture the same.

Beautiful Cars.

No road in all New-England has done more and better things to make railway traveling luxurious, as well as safe and swift, than the Eastern Railroad, and the public will be glad to learn of more evidences of other good offices in this direction. Four new passenger-cars built at the company's shops in Salem, J. P. Somerby, Master Mechanic, are worthy of a wide mention. Only two of these are running—these having made several trips—while the other two are nearly ready. The finish would seem to leave nothing to suggest as an additional comfort or even adornment, while there are some improvements over all other attempts at construction which are of great value. The ventilation is entirely different from the ordinary method, the fresh air coming in on a line at the base of the roof, and the heated air passing out at apertures above, thus keeping a perfect current on a level above the heads of the passengers. By this arrangement of "feeding," also, the dreaded smoke and cinders are kept out almost entirely. Another noteworthy improvement is in the arrangement of the windows. The glass is fastened by beadwork on the outside, and the joints are perfect. There is no rattle and no insidious current of air coming upon the head. More than this, the windows are raised and lowered upon glass pulleys, and so nicely fitted and balanced that a child may manage them. There is no more wrenching of joints or cracking of knuckles. There are also observable points in these cars, aside from their magnificence of finish and ornamentation, all of which the public will no doubt fully appreciate. A third one, whose mention we save to the last, is fitted for smoking and concomitants. It is equally luxurious with the rest, containing all the appliances as to ventilation, etc., and supplied with beautiful marble tables for games, which the same we do not understand, as "Truthful James" has remarked in the case of H. Chinee. Altogether this is pronounced by cosmopolitans to be the finest smoking-car on the continent, an opinion that we are not prepared to question. All these cars, as also most of the newer ones on the whole line, are furnished with the Whitman patent safety car stove, which can not be broken, and from which no fire can be spilled out in case of accident, perhaps one of the simplest and most significant of modern inventions. So much have we written concerning these magnificent cars and their outfit, from merely having been attracted to them while strolling about the depot yesterday. We are no stockholder in the Eastern road, nor is the Eastern road a stock-in us; but we do say that these beautiful cars are a first-class attraction even to the modern railway traveler.—*Portland Star.*

Seasoning Wood.

SMALL pieces of non-resinous wood may be perfectly seasoned by boiling for about five hours. Sash-frames of Spanish chestnut have been "wedged up" within six weeks of the tree being felled, which frames have stood to admiration. The boiling seems to take the sap out of the wood, which shrinks nearly 1-10th in the process. It is also well worth knowing that trees felled while in full leaf, in June or July, and allowed to lie with their tops and lops on until every leaf has fallen, are then very nearly dry, as the leaves will not drop off themselves till they have drawn up and exhausted all the sap in the tree. The time required is from a month to six weeks, according as the weather is dry or moist. Trees so treated will never "push" again, or show leaves, as the stocks of winter-felled timber almost invariably do if allowed to lie, and the former thus prove that they have lost that vitality which the latter retains. The floor of a mill laid with poplar so treated, and cut up and put in place in less than a month after the leaves fell, has never shown the slightest symptom of shrinkage or other indication of not being perfectly seasoned.—*The Cabinet-Maker.*

Louisville, Cincinnati, and Lexington Railroad.

FOR sixteen years Mr. John Skidmore has filled the position of master mechanic for this company. Like many other skilled mechanics, he learned his business in the great shops of Manchester, England, and has been engaged in it for thirty-three years. The car and repair shops of the company have for years been located at the corner of Floyd and Green streets; but since the extension of the line of the road to Cincinnati, the company have been compelled to seek more room. Seventeen acres have been purchased at Spring and Whitehall streets, on which a round-house, similar to that at the Nashville railroad yard, has been completed. Two large frame buildings, with tin roofs, for the construction of cars, have been erected. Mr. Thomas D. Shaw will have charge of this department, as master car-builder. He is considered one of the most experienced and practical men on the road. He is a stockholder, and consequently has an interest in every thing concerning the road, which makes his services very valuable. Mr. James Rapson is assistant in this department, and fills the position with all the faithfulness and ability that could be desired.

The machine-shops, which are to be 280 by 150 feet in dimensions, are in course of erection, the walls being rapidly built, and the whole structure will be under roof in sixty days. A building similar to this in size will be erected as a blacksmith-shop. All the departments will be supplied with improved and valuable machinery. There are two hundred men kept employed by this company in the various departments.

The improvements contemplated by the company are of the most extensive character, and show an enterprising spirit in the directors. The management of a road is often better known among its employees than among outsiders. Therefore, when we hear nothing but praise and credit for the skill and business management displayed by Mr. Samuel Gill, Superintendent, and Mr. Gimperling, his assistant, we are forced to believe that these gentlemen have been signally successful in their management, and that to their services are largely due the prosperity and success of the road.—*Louisville paper.*

ALTHOUGH one swallow will not make a summer, still a pin maliciously inserted in a chair will make one spring.

THE wind blows with such force in Colorado that when a man loses his hat he has to telegraph to the next station to stop it.

THE difference between an engine-driver and a violinist is, that one whistles down-brakes, and the other fiddles break-downs.

SAMUEL J. HOUSE, has been appointed master car-painter of the Allston paint-shops of the Boston and Albany Railroad.

Natural Gas-Works.

A WESTERN correspondent sends us the following account of a natural phenomenon at Erie, Pa.:

"Mr. Davenport, the President of the Erie Car-Works, showed me a somewhat remarkable application of one of nature's gifts to a practical purpose. About a year since, he sunk a well on the premises of the car-works to the depth of 703 feet, at which point he struck, not oil, but inflammable gas, which came to the surface in such abundance that it was at once utilized for light and fuel. It is now conveyed in pipes underneath the foundry-boiler, and so great is the pressure when fully turned on, it can, by means of a simple apparatus, be carried through the flues, superseding the use of ordinary fuel, and affording a larger fire-surface. The foundry and office are also lighted and heated with it, a short perforated pipe being placed in the stoves in place of the grates, and the gas introduced through the perforations. When the full pressure is on, the flame entirely fills the stove, and throws out about as much heat as a coal-fire. A large quantity of superfluous gas is allowed to escape from the well by means of a pipe reaching fifty or sixty feet in the air, and when it is ignited at the top of the pipe in a dark night, it illuminates the country for miles around. Twice a week, about a half-barrel of water, of a salty flavor and milky appearance, is pumped out of the well."

A dozen or so of such wells would be a boon to our large cities, provided the monopolists and politicians would not insist upon selling the product by metre and measure.

Rewards for Detecting Breakages.

SELF-INTEREST is of great aid in sharpening men's faculties, and the managers of the Bavarian railways take advantage of the fact to sharpen the eyes of their employees to detect fractures or breakages in any part of their rolling stock.

In that country, one of the rules of the railway system is to the effect that a reward, varying in amount from half a florin to one florin and a half, according to the importance of the case, shall be paid to every man employed in the stations, or on the lines, who discovers and makes known a flaw, defect, or break in the axle axle-holder, ("bandage,") or spring, of any carriage or engine attached to a train; or a defect or break in a coupling-iron.

Some such system, combining self-interest and self preservation, might be of use in this country, where so much damage to life and property occurs from broken axles, wheels, and other defective portions of rolling-stock. As a rule, we are induced to believe that the railways of Germany are better or at least safer managed than those of any other country, and a precautionary measure which is found of advantage there may well be followed.

Harrisburg Car Company.

THIS company was organized in 1853 as a copartnership, with a paid-up capital of $25,000. In 1863, it was reorganized as a stock company, and the capital increased to $75,000, and during the present year it has been increased to $300,000, with greatly increased facilities for car construction. The works comprise several departments; one for the manufacture of lathes, planing-machines, drills, etc.; also a foundry and machine-works, a steam saw and planing-mill, and a boiler-shop, recently erected. These combined advantages, with one of the best locations as regards convenient transportation, and easy access to iron, coal, and lumber, enable the company to prosecute the business of car-building with economy and dispatch. The entire works employ about 600 hands, and turn out annually a large number of cars of every class, which, in point of construction, are not excelled by any in the country. William Colder is President of the Company, and William T. Hildrup, Treasurer and General Superintendent.

A Speed-Indicator for Railway Trains.

AN ingenious device has been recently invented by Mr. Louis M. Clement, one of the engineers of the Central Pacific Railway. It is a self-registering speed-indicator, and consists, in brief, of a revolving cylinder, driven by clock-work, and so arranged and constructed in combination with a marker, actuated from the action of the car-wheels, that dots are made on a sheet of paper placed around the cylinder, at regular distances passed over by the train, while, at the same time, the lapse of time is given by lines drawn on this paper. In this way is obtained a complete record of the speed of the train, and the number and length of stoppages; so that the managers of the road cars always know whether the engineer has performed his duty in regard to running on time, etc. If, for instance, the engine-driver makes too long a stay at one point, and then tries to make up for lost time by running at an extra speed, (a fruitful source of collisions and other accidents,) this is unerringly shown by the simple device. We saw a record of a trip from Oakland to Ogden kept in this way. In this case, in starting out from Verdi, a freight train was met, and the train to which the apparatus was attached was compelled to back four fifths of a mile and then to lie over for some time, but arrived at its destination on time. The office at Sacramento was not notified of the fact, as should have been done, but the record showed the delay and stoppage, which led to the discovery of the real state of affairs.—*Scientific Press.*

Improved Rotary Engine.

MR. WILLIAM P. VICKERY, of East-Auburn, Maine, has invented an improved rotary steam-engine, for which he received a patent October 18th, 1870. It is described as follows:

It has within a circular casing two solid wheels separated by a partition. The circular casing is enough larger than the wheels to form an annular chamber to receive pistons fitting the same. Upon the top of the casing are placed the valve-seats, and through these are the ports through which enters the steam. Each wheel has its own inlet port and valve. Drop-valves compel the steam to work only on one side of the pistons. The drop-valves are raised when the pistons pass by means of inclined surfaces on one or both sides of the pistons, according as the engine is designed to move in one or both directions, but are pushed down again by springs. The drop-valves are between the exhaust and inlet ports, so as to be raised after the steam has been exhausted and before it is again admitted. The valve-stems are attached to rocking shafts, which are pivoted to suitable supports. These shafts are pivoted to a cam set on the shaft of the two solid wheels of the engine, and so operate as to open and close the valves as required to admit and let off the steam.

THE locomotive-works of Smith & Porter, at Pittsburg, recently destroyed by fire, are soon to be in operation again, with greatly increased facilities for the manufacture of light locomotives. The new shops are specially adapted to the construction of this class of engines. The firm has been reorganized under the name of Porter, Bell & Co. Now that so many narrow-gauge roads are being projected, there will doubtless be an increased demand for light, economical, and simply constructed locomotives, and this firm are preparing to meet it.

A DAY or two ago, a trial was made at the Illinois Central Railroad shops, of the value of Whipple and Dickenson's petroleum fuel, in a smelting-furnace. It was a most satisfactory and pronounced success, a white or melting heat being reached in just 53 minutes from the time of starting the fire. To attain this result has always taken, before this, four to four and a half hours, and the consumption of a large amount of coal. The Illinois Central Company and its employees are highly pleased with obtaining a better heat in so little time and so cheaply.

Miscellaneous Items.

THE Missouri, Kansas, and Texas Railroad Company are laying their track in the Indian Territory at the rate of two miles a day. They will reach the Arkansas River in July, and by early fall will be near enough to the Texas line to control trade.

THE Tredegar Iron-Works, at Richmond, Va., now turn out five tons of iron to one before the war, and last year manufactured 17,000 tons of wrought and cast-iron, in addition to implements, bringing $2,000,000 to the city of Richmond. They work from 800 to 1000 hands, and have capacity for from 1500 to 2000.

WILLIAM B. COATES, of Philadelphia, has perfected and secured an invention, simple and reliable, for indicating, by an alarm, when a car-axle breaks, and supporting it with safety to the passengers. His device operates, by pressure of friction, an alarm, the instant the axle is broken; and also brings into action an apparatus which supports the broken parts.

A BRAKEMAN on an Ohio railroad who, while in the discharge of his duties on the top of a freight car, was caught under the chin by a telegraph wire that passed across the track, and thrown beneath the cars, sustaining thereby the loss of a leg, brought suit for damages against the telegraph company, and has recovered $9000.

THE Pittsburg and Connellsville Railroad Company received recently from Wilmington, Delaware, several first-class passenger-cars, with all the modern improvements, and President Hughart has contracted for Pullman palace sleeping-cars, to be delivered in thirty days.

A RICHMOND woman, correspondent of a Virginia paper, says she interviewed Governor Walker the other day to ascertain his position on a railroad question, and that he asked, before committing himself what her own predilections were; and when she said that she was on the fence, he graciously said, "Then, madam, I wish no more agreeable position than to be sitting by your side."

HON. E. H. ROLLINS has been elected treasurer of the Union Pacific Railroad, in place of J. M. S. Williams, resigned.

THE last rail of the Pittsburg and Connellsville Railroad was laid at Mineral Point, Pa., on the 10th instant.

THE Baldwin Locomotive Works, are said to be looking for a locality better adapted to their business than that they now have in Philadelphia. Harrisburg is said to have offered strong inducements to the firm to remove thither, and Reading is looking into the matter.

Facetiæ.

"GOOD Heaven!" said an astonished greenhorn at the President's levee, calling the attention of his more experienced friend to the amazingly low-bosomed dresses worn by the fashionable ladies present, "did you *ever* see the like of *that?*"

"I think not," was the calm and considerate reply, "at least not since I was *weaned.*"

"Madam, has your piano an æolian attachment?" asked Sam, the other night, of the wife of a man who appeared to live up to if not beyond his income.

"Hush!" whispered Seth in his ear, "it has a sheriff's attachment!" Sam dropped the subject.

"I say, Bill, Jim's caged for stealing a horse."

"Sarved him right. Why didn't he buy one and not pay for it, like any other gentleman?"

In order to get an enemy, lend a man a small sum of money for a day. Call upon him in a week for it. Wait two months. In three months insist upon his paying you. He will get angry, denounce you, and ever after speak of you in abusive terms. We have seen this experiment tried repeatedly, and never knew it fail.

Did you ever buy a horse? If so, you have been struck with surprise at the great number of horses just seven years old. A shrewd Scotch jockey, whom I once employed to aid in the selection of a horse, as he examined the animal's mouth, inquired of the seller how old he was. "Seven years." "Ah!" said Johnny, "that seven years ago was a tremendous year for colts."

A nice, pious old man thought his oxen laid out strength brushing away flies, so he tied bricks to their tails. The plan worked well until one of the bricks struck the old man on the head. The oxen's tails are loose now.

Thompson and Rogers, two married bucks, wandering home late one night, stopped at what Thompson supposed was his residence, but which his companion insisted was his own house. Thompson rang the bell lustily, when a window was opened and a lady inquired what was wanted. "Madam," inquired Mr. T., "isn't this Mr. T—Thompson's house?" "No," replied the lady, "this is the residence of Mr. Rogers." "Well," exclaimed Thompson, "Mrs. T—T—Thompson—beg your pardon—Mrs. Rogers, won't you just step down to the door and pick out Rogers, for Thompson wants to go home?"

Parson Smoothbore, at a missionary meeting, accosted one of his close-fisted parishioners, and said,

"Come, William, give us something."

"Can't do it," replied Bill.

"Why not? Is not the cause a good one?"

"Yes; but I am not able to give any thing."

"Poh! poh! I know better; you must give a better reason than that."

"Well, I owe too much. I must be just before I am generous, you know."

"But, William, you owe God a larger debt than you owe any one else."

"That's true, parson, but then *he an't a pushing me like the balance of my creditors.*"

The parson's face got into rather a curious condition as he passed on.

Car-Wheel Manufacturers.

Atlantic Iron-Works	Portsmouth, Va.
Barnum & Richardson Manufacturing Co.	Chicago, Ill.
Barney & Smith Manufacturing Co.	Dayton, Ohio.
Bass & Hanna	Fort Wayne, Ind.
Davenport, Fairbairn & Co	Erie, Pa.
Dawson Manufacturing Co	Dawson, Ga.
Detroit Car-Wheel Works	Detroit, Mich.
Gill & Bidwell	Allegheny City, Pa.
Harrisburg Car Manufacturing Co.	Harrisburg, Pa.
Jackson & Woodin	Berwick, Pa.
John L. Gill	Columbus, Ohio.
Lobdell Car-Wheel Works	Wilmington, Del.
Missouri Car and Foundry Co	St. Louis, Mo.
Moore Elastic Car-Wheel Co	Jersey City, N. J.
Mowry Car and Wheel Works	Cincinnati, Ohio.
Ohio Falls Car Co	Jeffersonville, Ia.
Ramapo Wheel & Foundry Co	Ramapo, N. Y.
Scoville, J. & N. C	Buffalo, N. Y.
Taylor Iron Works	High Bridge, N. J.
Thompson, Douglas	Bordentown, N. J.
Tredegar Company	Richmond, Va.
Washburn, Hunts & Co	Jersey City, N. J.
Whitney & Sons	Philadelphia, Pa.
Woodbury & Company	E. Cambr'ge, Mass.
Wyoming Valley Manufacturing Co	Wilkesbarre, Pa.

Locomotive Builders.

Baldwin Locomotive Works	Philadelphia, Pa.
Brooks Locomotive Works	Dunkirk, N. Y.
Danforth & Cooke	Paterson, N. J.
Dickson Manufacturing Co	Scranton, Pa.
Grant Locomotive Works	Paterson, N. J.
Hinckley & Williams	Boston, Mass.
Manchester Locomotive Works	Manchester, N. H.
Mason, William	Taunton, Mass.
McKay Iron and Locomotive Works	Jersey City, N. J.
Portland Company	Portland, Me.
Pittsburg Locomotive Works	Pittsburg, Pa.
Rogers Locomotive Works	Paterson, N. J.
Rhode Island Locomotive Works	Providence, R. I.
Schenectady Locomotive Works	Schenectady, N. Y.
Porter, Bell & Co., (light locomotives,)	Pittsburg, Pa.
Taunton Locomotive Works	Taunton, Mass.

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1 inch motion,	$25	per car.
1¼ " "	30	"
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which have been tested on almost every road in the country.

1½ inch motion,	8	to a car,	$27.
1¾ " "	8	"	32.
2 " "	8	"	35.

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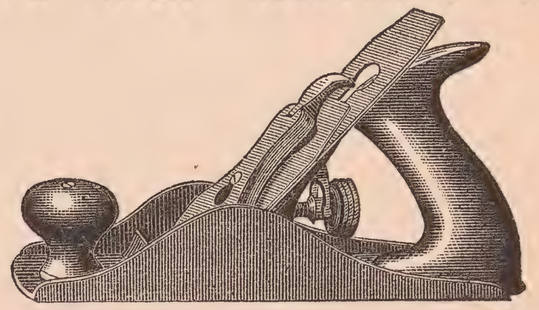

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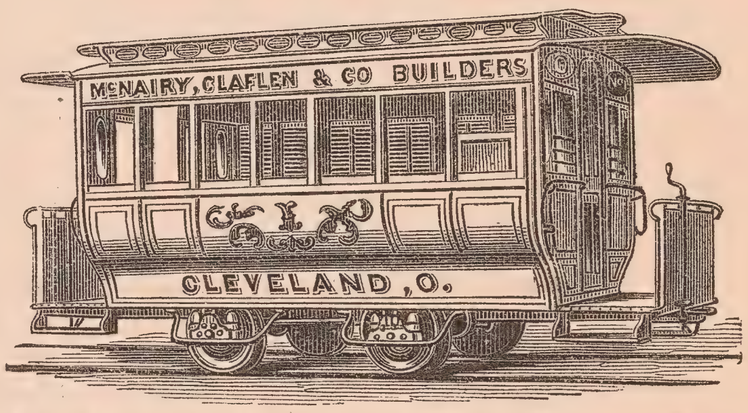

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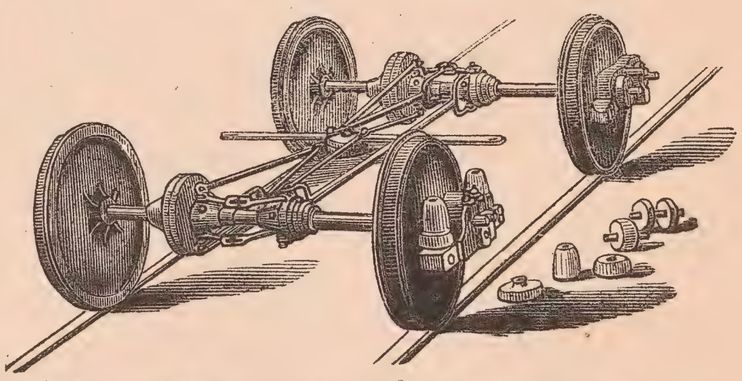

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Central of Georgia	B. L. Boulineau	C. C. Millar	Savannah, Ga.
Central of New-Jersey	†T. W. Peeples	George Hackett	Elizabethport, N. J.
Central Branch Union Pacific	Wm. D. Rowley	W. A. Grubb	Atchison, Kansas.
Central R. R. of Iowa	H. P. Vedder	H. P. Vedder	Elden, Iowa.
Central Pacific	A. J. Stevens	Benjamin Welch	Sacramento, Cal.
D			
Dayton & Union	A. J. Keenan	J. F. Feicht	Dayton, Ohio.
Danbury & Norwalk	Charles A. Craig	Wm. W. Bedient	Danbury, Ct.
Dayton & Michigan	William Cullen,	W. H. Allison	Cincinnatti, Ohio.
Delaware, Lackawanna & Western	Walter Dawson	Robert McKenna	Scranton, Pa.
Des Moines Valley	Morris Sellers	R. E. Smith	Keokuk, Iowa.
Detroit & Milwaukee	B. Briscoe	B. Briscoe	Detroit, Mich.
Delaware & Hudson Canal Co	James Dickson	Thomas Orchard	Carbondale, Pa.
Dorchester & Delaware			Cambridge, Md.
Dubuque South-western	J. M. Williamson	J. M. Williamson	Farley, Iowa.
Dutchess & Columbia			Washington, N. Y.
E			
Eastern		J. P. Somerby	Salem, Mass.
Eastern	John Thompson		East-Boston, Mass.
East-Tennessee & Virginia	Jos. Armbruster	Jos. Armbruster	Knoxville, Tenn.
East-Tennessee & Georgia	Eli Hixon		Knoxville, Tenn.
East-Pennsylvania	J. M. Geary	Samuel Reeves	Reading, Pa.
Erie Railway	*E. O. Hill		Susquehanna, N. Y.
Erie Railway	James B. Gregg		
Erie Railway	H. L. Brown	C. A. Smith	Jersey City, N. J.
Erie Railway	M. E. Brown	M. Wilder	Buffalo, N. Y.
Erie Railway	W. E. Cooper	W. E. Cooper	Hornellsville, N. Y
Erie Railway		W. E. Rutter	Elmira, N. Y
Evansville & Crawfordsville	John L. White	A. Sharra (fore'n)	Evansville, Ind.

* General Master Mechanic. † Mechanical Engineer.

Railroad.	*Master Mechanic.*	*Master Car-Builder.*	*Residence.*
Evansville, Henderson & Nashville	W. H. McCafferty	W. H. McCafferty	Nashville, Tenn.
European & North Am. (of Maine)	A. O. Bailey	J. H. Brown	Oldtown, Maine.
Erie & Pittsburg	John Young	John Young	Erie, Pa.
Eldora			Dubuque, Iowa.
F			
Florida	A. W. Taylor	G. Hernandez	Fernandina, Fla.
Flint & Pere Marquette	Sanford Keeler	Sanford Keeler	East-Saginaw, Mich.
Fitchburg	Geo. A. Cooledge	Enos Varney	Charlestown, Mass.
Fitchburg & Worcester			Fitchburg, Mass.
G			
Grand Trunk	*Richard Eaton	J. W. W. McWood	Montreal, Canada.
Galveston, Houston & Henderson	William McBeth	E. J. Sherman	Galveston, Texas.
Grand River Valley		James Potts	Jackson, Michigan.
Grand Rapids & Indiana			Fort Wayne, Ind.
Great Western of Canada	*Wm. A. Robinson		Hamilton, Canada.
Georgia	William Hardman	T. M. Preval	Augusta, Ga.
Greenville & Columbia	J. T. Price	J. T. Price	Helena, S. C.
H			
Hanover Branch	John J. Bingley	Henry Britcher	Hanover, Pa.
Hartford & New-Haven	N. Slingland	F. Leppense	Hartford, Ct.
Hannibal & St. Joseph	H. A. Towne	H. C. Whiting	Hannibal, Mo.
Hartford, Providence & Fishkill	Edwin Garfield	V. D. Perry	Hartford, Ct.
Hackensack & New-York	Abra'm Angausen		Hackensack, N. J.
Hastings & Dakota	C. C. Clements		Hastings, Minn.
Housatonic	C. R. Morris	J. Ferris	Bridgeport, Ct.
Houston & Texas Central	Reuben B. Snyder	J. F. Rice	Houston, Texas.
Houston Tap & Brazoria	A. Malsch	R. H. Yeomans	Houston, Texas.
Huntington & Broad-Top Mountain	D. G. Gilchrist	M. Tellerhoof	Saxton, Pa.
Hempfield	T. Marsh		Wheeling, Va.
Hudson River	Wm. Buchanan	John McKenna	New-York.
Hudson River	John Dykeman	Charles D. Mills	East-Albany, N. Y.
I			
Indianapolis, Cincinnati & Lafayette	H. M. Britton	H. M. Britton	Cincinnati, Ohio.
Indianapolis, Peru & Chicago	John McKenna	John McKenna	Peru, Ind.
Illinois Central	S. Hayes	C. Scoville	Chicago, Ill,
Iowa & Missouri State Line			Farmington, Iowa.
Iron	Perry Scott	Clem. Roetling	Ironton, Ohio.
Indianapolis & St Louis	C. E. Benton	C. E. Benton	Mattoon, Ill.
Indianapolis, Bloomington & Western		S. S. Smith	Urbana, Ill.
Ionia & Lansing	H. Loughlin		Lansing, Mich.
J			
Jeffersonville, Madison & Indiana	Reuben Wells	John Higgins	Jeffersonville, Ind.
Jackson, Lansing & Saginaw	Andrew Wilson	A. Wilson	Jackson, Michigan.
K			
Keokuk & St. Paul	P. R. Sutton	Wm. McElroy	Keokuk, Iowa.
Knox & Lincoln			Bath, Maine.
Kentucky Central	J. R. Ledyard	J. L. Hackenthorn	Covington, Ky.
Knoxville & Charleston			Knoxville, Tenn.
Kansas Pacific	Geo. W. Cushing	Geo. W. Cushing	Wyandotte, Kansas.
Kalamazoo, Allagan & Grand Rapids			Kalamazoo, Mich.
Kansas City, St. Joseph & Council Bluff	H. L. Cooper		St. Joseph, Mo.
L			
Lake Erie & Louisville	John Pero		Fremont, Ohio.
Lackawanna & Bloomsburg	Chas. Graham		Kingston, Pa.
Lehigh Valley	J. Kinsey	E. R. Brown	South-Easton, Pa.
Lehigh Valley	P. Hofecker		Weatherly, Pa.
Lehigh Valley	A. Mitchell	Mauch Chunk, Pa.	Delano, Pa.
Lehigh Valley	D. Clark		Hazelton, Pa.
Lehigh & Susquehanna	L. C. Brastow	L. C. Brastow	Wilkesbarre, Pa.
Lehigh & Susquehanna	Wm. H. Brown		Mauch Chunk, Pa.
Leavenworth, Lawrence & Gal.	S. Philbrick		Lawrence, Kansas.
Lewy's Island	C. W. Button	Damase Merceir	Milltown, Maine.
Little Rock & Fort Smith			Little Rock, Ark.
Lebanon Springs			Burlington, Vt.
Little Miami, Col. & Xenia	J. H. Setchel	M. P. Ford	Cincinnati, Ohio.
London & Port Stanley			London, C. W.
Louisville, New-Albany & Chicago	Jacob Losey	Jacob Losey	New-Albany, Ind.
Long Island	Chs. A. Thompson	E. A. Olmstead	Hunter's Point, L. I.
Louisville, Cincinnati & Lexington	John Skidmore	Theo. G. Shaw	Louisville, Ky.
Louisville & Nashville	Thatcher Perkins	Thatcher Perkins	Louisville, Ky.
Lake Shore & Michigan Southern	†James Sedgley		Cleveland, Ohio.
Michigan Southern Division	James K. Taylor	John Kirby	Adrian, Mich.
Buffalo Division	B. H. Kidder.		Buffolo, N. Y.
M			
Macon & Augusta			Macon, Ga.
Maine Central	J. W. Philbrick	J. W. Philbrick	Waterville, Me.
Macon & Western	B. Pope Freeman	James A. Knight	Macon, Ga.
Manchester & Lawrence	Edward Studley	M. W. Dickerman	Concord, N. H.
Macon & Brunswick	M. Thornton	M. Thornton	Macon, Ga.
Maysville & Lexington			Maysville, Ky.
Marietta & Cincinnati	E. Bosley	E. Bosley	Chillicothe, Ohio.
Memphis, Clarksville & Louisville			Clarksville, Tenn.
Memphis & Little Rock	D. R. Wing		Little Rock, Ark.
Memphis & Charleston	Michael Burk	A. W. Drew	Memphis, Tenn.
Memphis & Charleston	L. M. Sellars	Thomas Varun	Huntsville, Ala.
Mineral Point	Robert Hay		Mineral Point, Wis.
Mississippi & Tennessee	Henry Teague	Henry Teague	Memphis, Tenn.
Mississippi Central	Henry Gibbon	John E. Becton	Water Valley, Miss.
Maryland & Delaware	Samuel Peters		Greensboro, Md.
Mississippi, Gains. & Tus			Gainsville, Ala.
Midland Pacific			Nebraska City, Neb.
Milwaukee & St. Paul	T. S. Davis	Wm. E. Kettridge	Milwaukee, Wis.
Milwaukee & St. Paul		John Baillie	Milwaukee, Wis.
Minnesota, Iowa & Dakota Division	James Waters	D. F. Wilson	Minneapolis, Minn.
Michigan Central	A. S. Sweet, Jr	J. B. Sutherland	Detroit, Mich.
Montgomery & West-Point	J. McVey	W. H. Daniels	Montgomery, Ala.
Montgomery & Eufaula	James McCann	I. E. Holmes	Montgomery, Ala.
Mobile & Montgomery	James McFarland	L. Barham	Montgomery, Ala.
Mobile & Girard	William Eyles	A. J. Nix	Girard, Ala.
Mobile & Ohio	L. J. Fleming	John McHugh	Mobile, Ala.
Missouri River, Fort Scott & Gulf	John McCrumm		Kansas City, Mo.
Missouri, Kansas & Texas			
N			
Nashville & Chattanooga	John U. Eastman	J. G. Sawyer	Nashville, Tenn.
Nashville & Decatur	C. B. Knowles	C. B. Knowles	Nashville, Tenn.
New-Bedford & Taunton	Robert Chase	Robert Chase	New-Bedford, Mass.
New-Canaan			New-Canaan, Ct.
New-Brunswick & Canada	T. Armstrong	T. Armstrong	Saint Andrew's N. B.
New Haven & Northampton	Henry Fox	Henry Fox	Westfield, Mass.
New-York & Oswego Midland	Wm. H. Griggs		Oneida, N. Y.
New-York & Harlem	Wm. M. Strong	Leander Garey	New-York.
New-York Central	* C. T. Ham	Joseph Jones	Albany, N. Y.
New-York Central	G. B. Van Vorst		Albany, N. Y.
New-York Central	Henry Watkeys		Syracuse, N. Y.

* Mechanical Superintendent. † General Master Mechanic.
‡ General Master Mechanic and Master Car-Builder.

Railroad.	Master Mechanic.	Master Car-Builder.	Residence.
New-York Central	Amos Gould		Rochester, N. Y.
New-York Central		Wm. Johnson	Buffalo.
New-York & Flushing			Flushing, L. I.
New-York, Providence & Boston	Jas. H. Anderson	Jas. H. Anderson	Providence, R. I.
New-York & New-Haven	H. Kittendorf	M. C. Andrews	New-Haven, Ct.
New-London Northern	J. W. Dow	George Boyden	New-London, Ct.
New-Jersey & Transportation Co	John Headden	David H. Baker	Jersey City, N. J.
New-Haven & Derby			New-Haven, Ct.
New-Orleans, Opelousas & Gt. Western	John McCluskey	Matthew Nolan	Algiers, La.
New-Lisbon			Leetonia, Ohio.
New-Orleans & Ohio	John R. Jordan	John R. Jordan	Paducah, Ky.
New-Orleans, Jackson & Gt. Northern	John Conlon	Charles Bartine	New-Orleans, La.
New-Haven, Hartford & Springfield			Hartford, Ct.
Naugatuck		George W. Gray	Bridgeport, Ct.
Newark & Bloomfield	Luke F. Tronson		Hoboken, N. J.
Nova Scotia	W. Johnson		Bedford, N. S.
North-Missouri	John Calhoun	C. S. Buck	St. Louis, Mo.
North-Carolina	E. Wade	B. G. Sergeant	Co. Shops, N. C.
New-Orleans, Mobile & Chattanooga	Josiah Bettis	George Shattuck	Mobile, Ala.
Northern Central	C. M. Lewis		Baltimore, Md.
Northern Central		G. W. Demarest	York, Pa.
North-Lebanon		Henry B. Oves	Lebanon, Pa.
North-Pennsylvania	Franklin Roop	Franklin Roop	Philadelphia, Pa.
North-Eastern	D. W. Haines	A. M. Corrie	Florence, S. C.
Northern	James W. Lander	Albert Langmaid	Concord, N. H.
Northern of New-Jersey	T. W. Demarest		New-York.
Norwich & Worcester	Richard Colburn	G. R. Bentley	Norwich, Ct.
Northern of Canada	James W. Forster		Toronto, Can.
Norfolk & Petersburg	J. S. Whitworth	J. S. Whitworth	Norfolk, Va.

O

Ogdensburg & Lake Champlain	William A. Short		Malone, N. Y.
Oswego & Syracuse	Josiah Bettis	J. H. Parker	Oswego, N. Y.
Ohio & Mississippi	George W. Harris	M. M. Martin	Cochran Shops, Ind.
Old Colony & Newport	C. F. Bullock	A. Gleason	Boston, Mass.
Orange, Alexandria & Manassas	James E. Waddy	John T. Nalls	Alexandria, Va.
Oil City & Pithole	George Thompson		Pithole, Pa.
Oil Creek & Alleghany River	J. S. McElroy	Jacob Williams	Corry, Pa.
Oil Creek & Alleghany	H.J.Bookhammer.	John Monks	Oil City, Pa.

P

Panama	Thomas Cobb	J. G. Wilson	Aspinwall, N. G.
Pacific of Missouri	Jacob Johann	Jacob Johann	St Louis, Mo.
Paterson & Newark			Paterson, N. J.
Pennsylvania	* Isaac Dripps		Altoona, Pa.
Pennsylvania	H. D. Garrett	I. W. Van Houten.	W. Philadelphia, Pa.
Pennsylvania	M. A. Shattuck	Samuel W. Myers.	Harrisburg, Pa.
Pennsylvania	T. W. Worsdell	John P. Levan	Altoona, Pa.
Pennsylvania	D. O. Shaver	R. S. Ramsey	Pittsburg, Pa.
Philadelphia & Erie	T. J. Hamer	George J. Mason.	Sunbury. Pa.
	W. L. Foster	Robt.M.Messimer.	Renovo, Pa.
	W. L. Holman	Wm.P. Newcomb.	Kane, Pa.
	W. T. Smith	John Quigley	Erie, Pa.
Philadelphia, Wilmington & Baltimore	George W. Perry	George W. Perry	Wilmington, Del.
Philadelphia & Reading	John Wootten	Aaron Steinbach	Reading, Pa.
Philadelphia, Germ'n & Norris'n	John Moyer	Nathan Pawling	Philadelphia, Pa
Philadelphia & Baltimore Central	S. D. Danfield	SamuelD.Danfield.	Chester, Pa.
Pittsburg, Cincinnati & St. Louis	James Ball	James Ball	Logansport, Ind.
	Robert Curtis	Theo. Chamberlain.	Columbus, Ohio.
	Thomas Denmead		Dennison, Ohio.
	Thomas V. Losee.	John Gottschall	Indianapolis, Ind.
		James McGee	Steubenville, Ohio.
Pittsburg, Fort Wayne & Chicago	S. M. Cummings	John Marquis	Alleghany, Pa.
Pittsburg, Fort Wayne & Chicago	J. M. Boon	Wm. Waddington.	Fort Wayne, Ind.
Pittsburg & Connellsville	D. P. Rennie	J. M. Rutter	Connellsville, Pa.
Peoria, Pekin & Jacksonville	J. S. Hurd	J. S. Hurd	Pekin, Ill.
Peninsular			Battle Creek, Mich.
Portland & Rochester	Jas. S. Drake	Samuel Dean	Portland, Me.
Portland & Kennebec	John Ellis	J. W. Trussel	Augusta, Me.
Portland & Oxford Central	Geo. W. Battles	Geo. W. Battles.	Buckfield, Me.
Portland, Saco & Portsmouth	John Donnell		Portland, Me.
Port Royal			Beaufort, S. C.
Port Hope, Lindsay & Beaverton	H. G. Taylor	H. G. Taylor	Port Hope, Can.
Port Huron & Lake Michigan			Port Huron, Mich.
Providence, Warren & Bristol	Rufus Smith	J. Brightman	Bristol, R. I.
Portsmouth, Gt. Falls & Monmouth	James Tucker	E. Fall	Union Village, N.H.
Petersburg	R. B. Adams	Alex. Wright	Petersburg, Va.
Providence & Worcester	Joseph Kelly	Olney L. Smith	Providence, R. I.
Peninsular R. R.	T. G. Templeton		Battle Creek, Mich.

R

Raritan & Delaware Bay	Rufus Blodgett	Rufus Blodgett	Manchester, N. J.
Raleigh & Gaston.	J. B. Gayle	J. B. Gayle	Raleigh, N. C.
Rensselaer & Saratoga	W. B. Gage		Troy, N. Y.
Richmond, Fredericksburg & Potomac	H. Kuhn	W. H. Trainham	Richmond, Va.
Richmond & Danville	John McFarland	B. P. Owen	Richmond, Va.
Richmond & Petersburg	Wm. Piermont	J. J. Martin	Richmond, Va.
Richmond & York River			Richmond, Va.
Rome, Watertown & Ogdensburg	Wm. Jackson	Wm. Jackson	Rome, N. Y.
Reading & Columbia	B. Van Lew		Columbia, Pa.
Rome, Georgia	O. W. Harbin	O. W. Harbin	Rome, Ga.
Rochester & Genesee Valley	M. Wilder	M. E. Brown	Buffalo, N. Y
Rockford, Rock Island & St. Louis	D. R. Grant		Beardstown, Ill.
Rock Island & Peoria			Rock Island, Ill.
Rutland	N. L. Davis	M. M. Crooker	Rutland, Vt.

S

San Francisco & San José	R. B. Bishop	Frank Bellisle	San Francisco, Cal.
St. Croix & Lake Superior			New-York City.
St. Lawrence & Ottawa	Calvin Dame	Calvin Dame	Prescott, Canada.
St. Paul & Pacific	C. N. Parker, Jr	C. B. Boynton	St. Paul, Minn.
St. Louis & Iron Mountain	O. A. Haines	Oscar Doolittle	Carondelet, Mo.
Sandusky, Mans. & Newark		Charles Scoeby	Sandusky, Ohio.
St. Joseph Valley			Kalamazoo, Mich.
San Antonio & Mexican Gulf	W. T. Bingham		Victoria, Texas.
South Side of Long Island			New-York.
St. Paul & Sioux City	Jas. G. Butterfield		Shakopee, Minn.
St. Louis, Vandalia & Terre Haute	A. J. Sandborn		Effingham, Ill.
South-Carolina	W. B. Smith	John Reed	Charleston, S. C.
South-Side of Virginia	J. T. Robinett	J. T. Robinett	Petersburg, Va.
South & North Alabama	S. Schermerhorn	M. S. Riddle	Lime Station, Ala.
Southern Minnesota	Wm. Lininger	W. H. Dunham	Hokah, Minn.
South-Pacific	John Hewitt		Pacific, Mo.
South-Western of Georgia	C. D. Wall	F. H. Alley	Macon, Ga.
South Shore	Warren E. Ray		Cohasset, Mass.
Shore Line		C. F. Platt	New-Haven, Ct.
Stanstead, Shefford & Chambly	W. H. Smith	M. Sessions	Waterloo, C. E.
Schuylkill & Susquehanna	John E. Wootten	John E. Wootten	Reading, Pa.
Selma & Meridian	John Davis	G. K. Ashley	Selma, Ala.
Seaboard & Roanoke	J. B. Pendleton	J. B. Pendleton	Portsmouth, Va.
Stonington & Providence	J. H. Anderson	J. H. Anderson	Providence, R. I.
Selma, Rome & Dalton	Geo. S. Howden	W. W. Peirce	Selma, Ala.
Sioux City & Pacific		J. R. Dow	Missouri Val., Iowa.
Spartanburg & Union	J. N. Benner	Jacob Rice	Union C. H., S. C.
Sheboygan & Fond du Lac	J. H. Erwin	J. H. Erwin	Sheboygan, Wis.
Sullivan & Erie			Tonawanda, Pa.
Syracuse & Binghamton, N. Y.	B. G. Merrill	B. G. Merrill	Syracuse, N. Y.
Sycamore & Cortland			Sycamore, Ill.

* Superintendent of Motive Power and Machinery.

Railroad.	Master Mechanic.	Master Car-Builder.	Residence.

T

Taunton Branch			Taunton, Mass.
Tioga	Peres Bonny	D. H. Stratton	Blossburg, Pa.
Texas & New-Orleans	R. B. Baer		Houston, Texas.
Tennessee & Pacific	William McKeand.	William McKeand.	Nashville, Tenn.
Terre Haute & Indianapolis	C. R. Peddle	H. Kirmse	Terre Haute, Ind.
Toledo, Wabash & Western	W. F. Ray		Fort Wayne, Ind.
Toledo, Wabash & Western	T. G. Gorman	David Hoit	Toledo, Ohio.
Toledo, Peoria & Warsaw	A. H. De Clerq	R. M. Hemphill	Peoria, Ill.
Troy & Bennington			Troy, N. Y.
Troy & Boston	Foster Church	R. V. Coon	Troy, N. Y.

U

Union Pacific	I. H. Congdon	Geo. E. Stevens	Omaha, Nebraska.
Utica & Black River	John Bailey.	David James	Utica, N. Y.
Utica, Chenango & Susquehanna	C. H. Brown		Utica, N. Y.

V

Virginia & Tennessee	F. Herk	I. A. Caldwell.	Lynchburg, Va.
Vicksburg & Meridian	Jas. B. Brown		Vicksburg, Miss.
Vineland			Vineland, N. J.
Vermont Central	J. M. Foss	Milton Sessions	St. Albans, Vt.
Vermont & Massachusetts	W. F. Kenney	Jacob Marsh	Fitchburg, Mass.
Vermont Valley			Rutland, Vt.

W

Washington, Alex. & Georgetown			Washington, D C.
Warwick Valley			Warwick, N. Y.
Wicomico & Pocomoke			Berlin, Md.
Wilmington & Manchester	George Hall	William Kinyon	Wilmington, N. C.
Wilmington, Charlotte & Rutherford	W. A. Gill	Thomas Myers	Laurenburg, N. C.
Wilmington, Columbia & Augusta			
Winchester & Potomac			Winchester, Va.
Westchester & Philadelphia	P. C. Clark	P. C. Clark	Philadelphia, Pa.
Wilmington & Weldon	John F. Devine	John F. Devine	Wilmington, N. C.
West-Jersey	W. McAllister	C. C. Williams	Camden, N. J.
Western Maryland	R. V. Dohoney	J. H. Nussear	Union Bridge, Md.
Winona & St. Peter	F. C. Ford	H. L. Preston	Winona, Minn
Western North-Carolina	E. H. Marsh	E. H. Marsh	Salisbury, N. C.
Western R. R. N. C	M. W. Atkinson	M. W. Atkinson	Fayetteville, N. C.
West-Feliciana	R. C. Brower		Woodville, Miss.
Whitehall & Plattsburg			Plattsburg, N Y.
Western & Atlantic	James Mullin	John Sherman	Atlanta, Ga.
Worcester & Nashua	George H Griggs	George H. Griggs	Worcester, Mass.
Welland	William Wells	William Pay	St. Catharine, C. W

CAR MANUFACTURERS.

Allison, W. C. & Sons	Philadelphia, Pa.
Anderson, J. R. & Co	Richmond, Va.
Altoona Manufacturing Co	Altoona, Pa.
Adrian Car Co	Adrian, Mich,
Barney & Smith Manufacturing Co	Dayton, Ohio.
Baker, Jackson & Co	Latrobe, Pa.
Billmeyer & Smalls	York, Pa.
Bradley, Osgood	Worcester, Mass.
Brill & Son	Philadelphia, Pa.
Bitner, George W	Pittsburg, Pa.
Cambridge City Car Co	Cambridge City, Ind.
Canada Steam-Engine Co	Kingston.
Clendenning, W. W	Montreal.
Cummings, W. H	Jersey City, N. J.
Connellsville Machine and Car Co	Connellsville, Pa.
Detroit Car and Manufacturing Co	Detroit, Mich.
Dawson Manufacturing Co	Dawson, Ga.
Dickey, Neill & Co	Toronto.
Dickson Manufacturing Co	Scranton, Pa.
Erie Car-Works	Erie, Pa.
Elmira Car-Works	Elmira, N. Y.
Fredericks & Co	Catasauqua, Pa.
Gardner, F. & Co.	Carlisle, Pa.
Gill, John L	Columbus, Ohio.
Gilbert, Bush & Co	Troy, N. Y.
Goold, James & Co	Albany, N. Y.
Goodrich Car Co	Augusta, Ga.
Grice & Long	Trenton, N. J.
Haskell & Barker	Michigan City, Ind
Harrisburg Car Manufacturing Co	Harrisburg, Pa.
Heathcote, Herbst & Co	Glen Rock, Pa.
Hamilton, William & Son	Toronto.
Harlan, Hollingsworth & Co	Wilmington, Del.
Jackson & Sharp	Wilmington, Del.
Jackson & Woodin	Berwick, Pa.
Jones, J. M. & Co	West-Troy, N. Y.
Lombard, Thomas	Augusta, Me.
Lebanon Manufacturing Co	Lebanon, Pa.
Michigan Car Co	Detroit, Mich.
McNairy, Claflen & Co	Cleveland, Ohio.
Murray, Dougall & Co	Milton, Pa.
McVey, Walker & Co	Braddock's Field, Pa.
Meeker & Hedden	Newark, N. J.
Mowry Car and Wheel Works	Cincinnati, O.
Middletown Car & Manufacturing Co	Middletown, Pa.
Missouri Car and Foundry Co	St. Louis, Mo.
New-Haven Car Co	New-Haven, Ct.
Ohio Falls Car Co	Jeffersonville, Ind
Peabody & McDonald	Calais, Me.
Peters, Simon	Quebec.
Pittsburg and McKeesport Car Co	McKeesport, Pa.
Pittsburg Car and Locomotive Co	Pittsburg, Pa.
Portland Co	Portland, Me.
Pullman Car Co	Chicago.
Quealy, W. J	Hannibal, Mo.
Ranlet Car Manufacturing Co	Laconia, N. H.
Russell & Co	Massillon, Ohio.
Sands, William L	Pottstown, Pa.
Schall, Michael	York, Pa.
Shaaber, W	Reading, Pa.
Stephenson, John. & Co	New-York, N. Y.
Stem, George H. & Co	Stemton, Pa.
Southern Car-Works	Independence, La.
Taunton Car Co	Taunton, Mass.
Tredegar Co	Richmond, Va.
Vigo Foundry and Terre Haute Car Works	Terre Haute, Ind.
Whittaker, Phillips & Co	Toledo, Ohio.
Wason Manufacturing Co	Springfield, Mass.
Weimer, P. L. & Bros.	Lebanon, Pa.
Wyoming Valley Manufacturing Co	Wilkesbarre, Pa.

WENDELL'S PATENT

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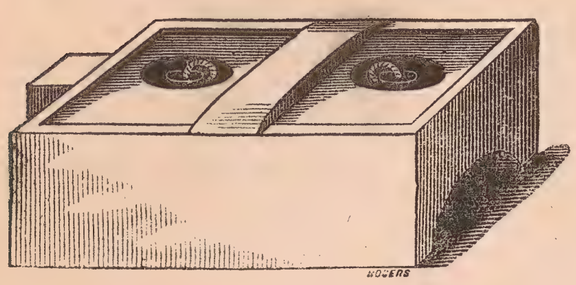

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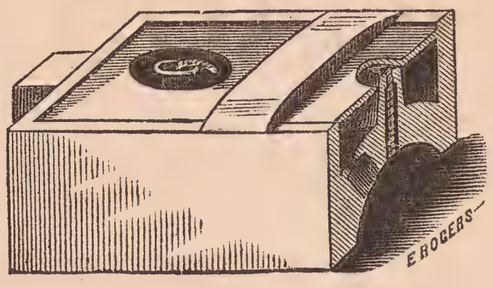

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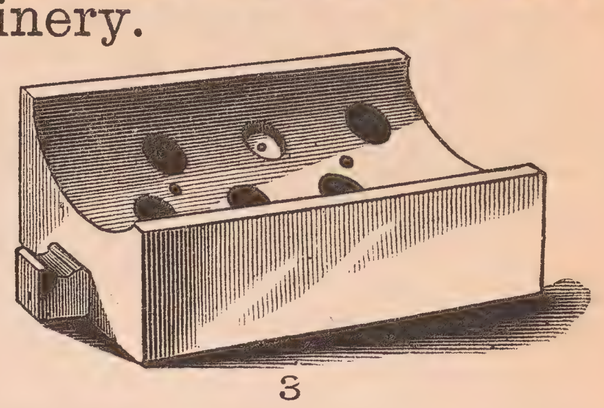

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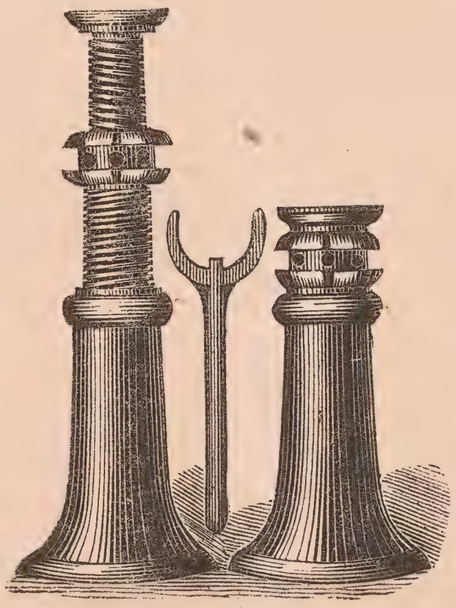

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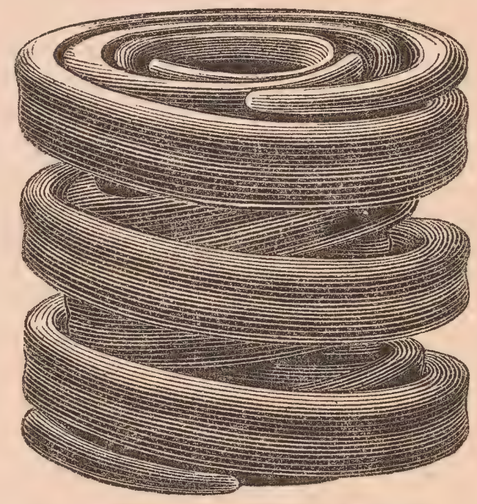

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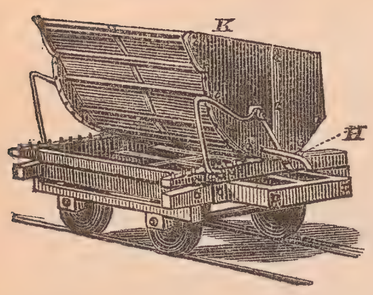

Fig. No. 1 Car Loaded and at Rest.

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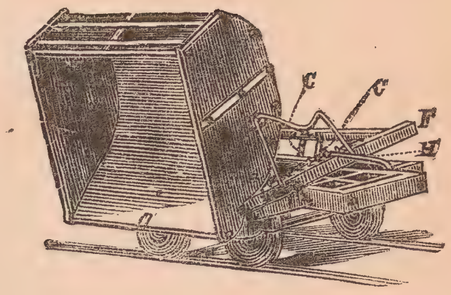

Fig. No. 2, Car Dumped.

TO DUMP THE CAR.

The brakeman seizes the lever, H, and raises it about a foot, thus releasing the box from the catch, C, and the rocking frame, F, from the catch, C, when the box, K, yields to the force of gravity and rolls over to the position shown in Fig. 2.

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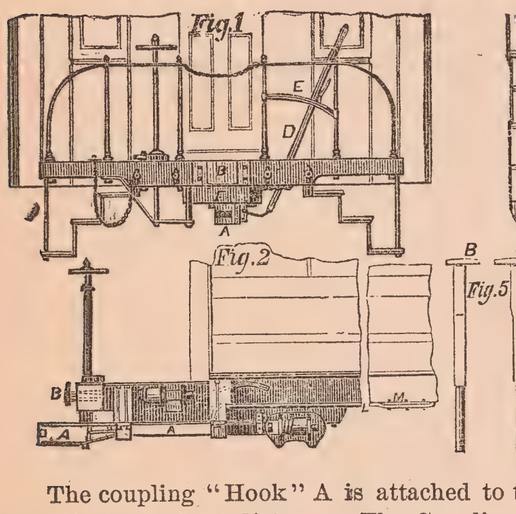

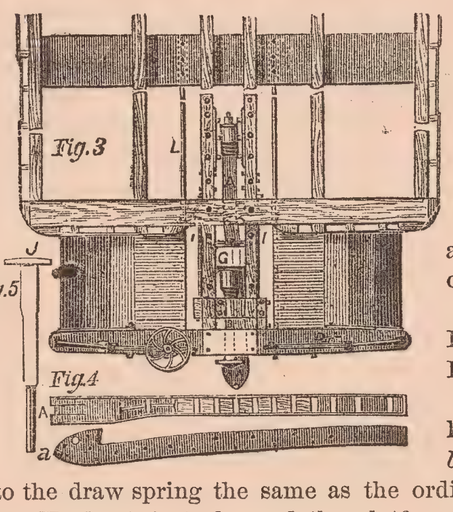

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DESCRIPTION.

Figure 1 is an elevation; Figure 2, a longitudinal section; Figure 3, a plan of an end of a car to which the arrangement has been applied; and Figures 4 and 5 show top and side views of the "Hook" and "Buffer," drawn on a larger scale than that of Figures 1, 2, and 3.

The letters refer to the same parts in all the figures. A is the coupling "Hook," B the "Buffer," C the "Stop," D the "Lever," E the "Quadrant Ratchet," F the "Truss Beam," G the "Spring Beam," H the "Suspender Beam," I the "Upward Trusses," K the "Main Spring," L the "Downward Trusses," and M the "Bolster."

The Platforms, instead of being located below the centre line of the main sills of the cars, are placed *in* that line, and held there by the Trusses I and L, so that the point of contact (in Buffers B) is *in* the said centre line and *no below* it.

The coupling "Hook" A is attached to the draw spring the same as the ordinary draw head, and at the same height above the track, but in such a manner that the outer end is free to move laterally for a short distance. The Coupling Hook projects beyond the platform. The Stop C is placed under the Buffer Beam to prevent accidental uncoupling. When two cars are brought together, the Coupling Hooks, from *their shape*, push each other aside, until the Buffers B are compressed hard on the Buffer Springs, then—*the points of the hooks having passed each other sufficiently far*—the Hooks are carried forward by their main-springs, and thus the "*Coupling*" and "*Compression*" are both effected automatically *and at the same time*, and without the use of links and pins. When two cars are thus coupled together, the *head* of the *Hook* of each car is under the Buffer Beam of its opposite car, and the platforms are close together, (about 4 inches apart.) The effect of this is, *one platform can not be forced over the other*, nor can a *child* fall between the platforms; the dust and rain are nearly all shut out; the "Compression" makes the train run steadily, and prevents all jerking at starting and stopping.

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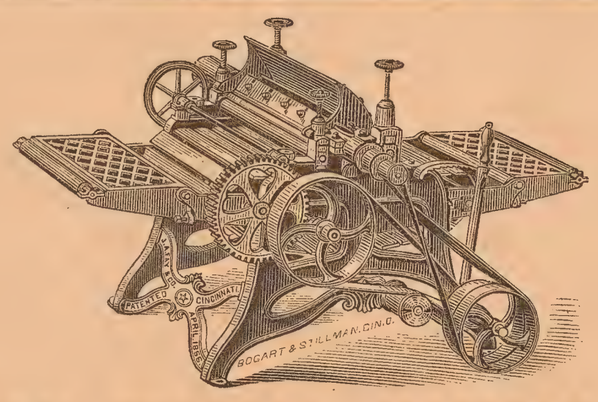

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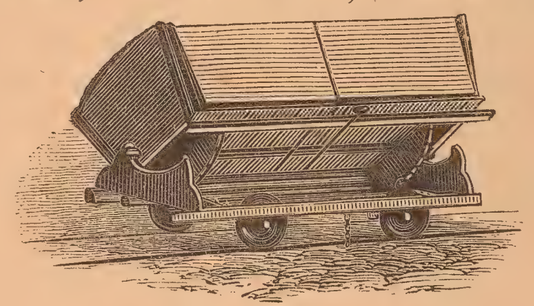

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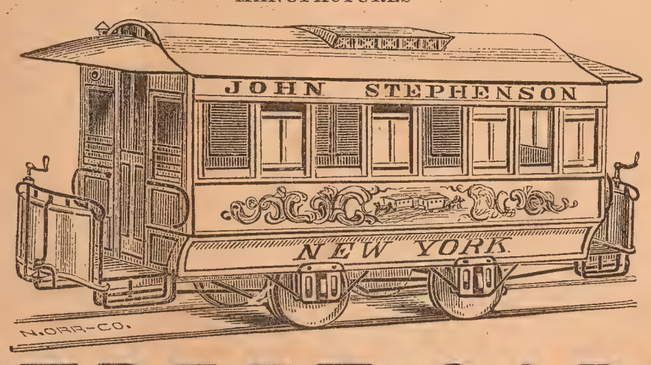

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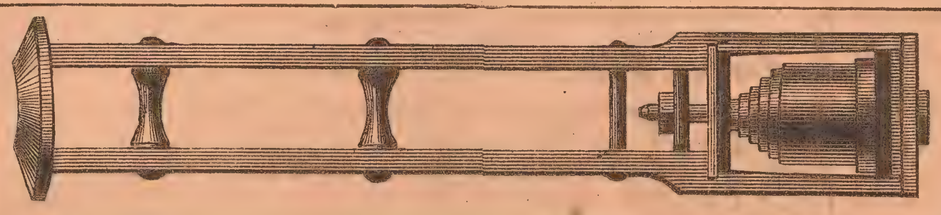

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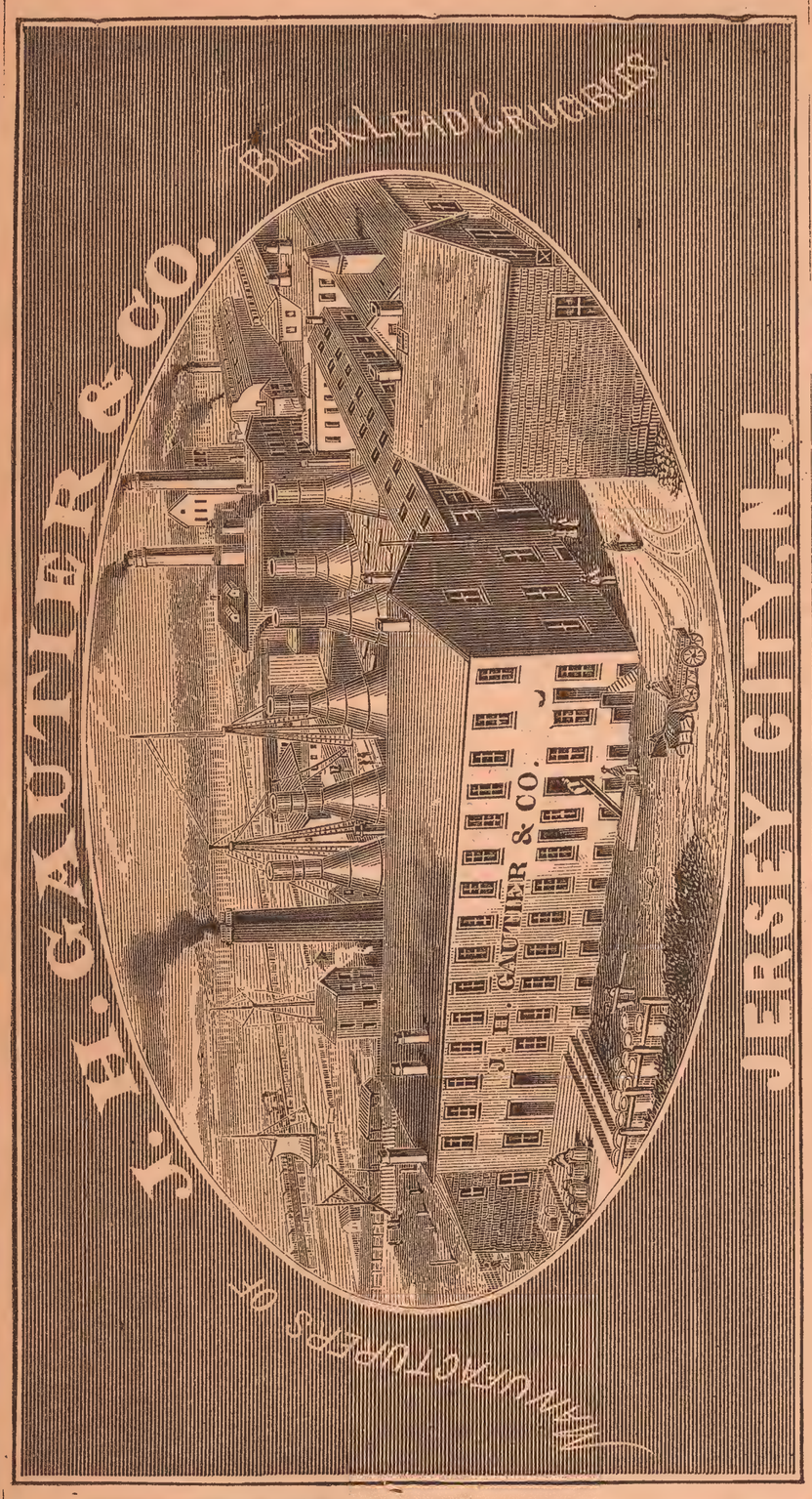

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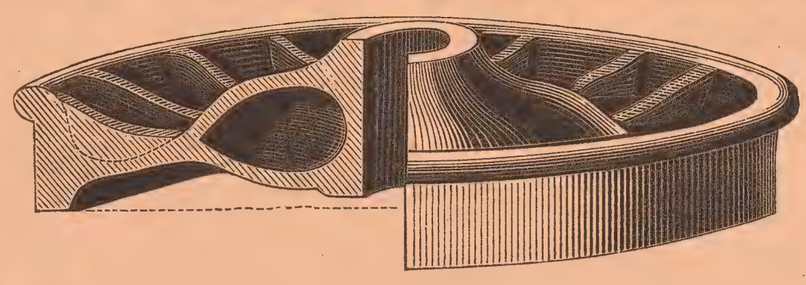

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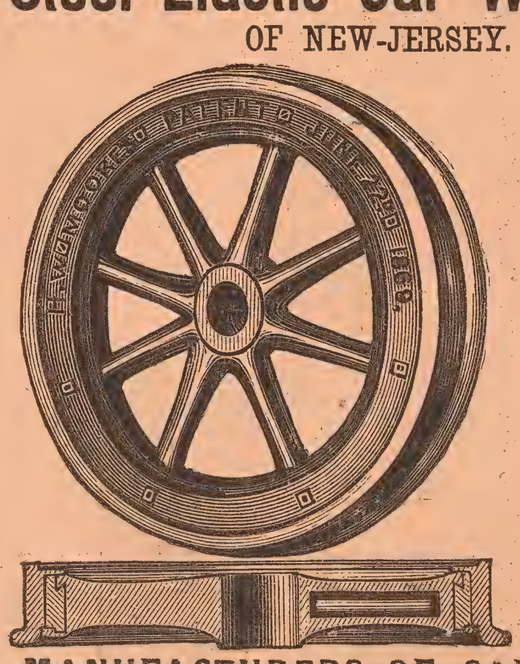

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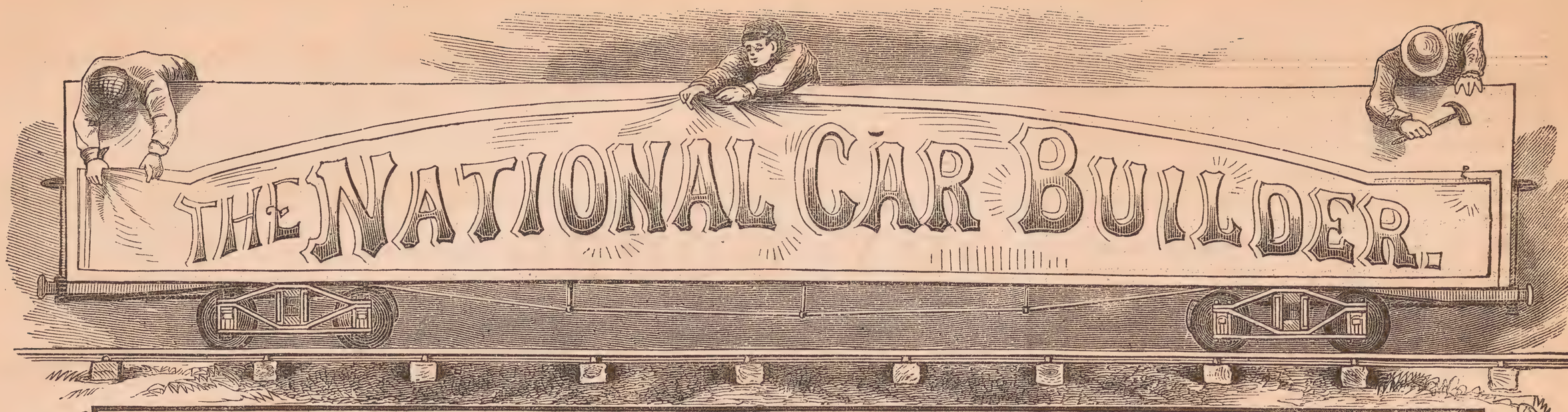

DEVOTED TO THE INTERESTS OF RAILWAY ROLLING STOCK.

Vol. 1. No. 12. } JUNE, 1871. { 50 Cents per Annum. Single Copies, 10 Cents.

Gas on Railroad Cars.

THE Pennsylvania Railroad Company now light 35 passenger cars with gas, and additions to the number are being made as rapidly as possible, and it is the intention of the company to light all the passenger trains in this manner. For the purpose of supplying cars with gas, proper provision will be made at various points east and west. A building is already in use at Pittsburg, containing six gas reservoirs connected by pipes with each other, with a large meter. These reservoirs are calculated to withstand a pressure of 400 pounds to the square inch. The gas, as it passes into the reservoirs, goes through the meter, so that an exact record of the uncondensed gas can be kept. At present the gas is obtained from the city. Preparations are being made, however, to manufacture it from crude oil, in the depot yard, which, it is thought, can be accomplished at a saving of one fourth the present cost, with greater illuminating power. From the condensing-tanks in the building a pipe runs out under the platform. It separates into several branches, each of these running between two of the tracks on which the waiting trains stand. At intervals over these pipes are trap-doors, and in the pipe, at each of these openings, is a coupling for hose. When a car is to be supplied, the trap-door nearest to it is opened, a rubber hose is coupled to the pipe and to the car reservoir, the stop-cock in the reservoir building is turned, and the car-tanks are filled.

The apparatus attached to the cars is by no means complicated. On each side of the car, under the floor, is one of the boiler reservoirs, smaller than those in the building, and into these the gas is conducted by the hose. A pipe passes from these into the car saloon, where a small meter is situated. When "lighting time" arrives the gas is turned on here. There are five burners in each car. A bracket burns in the saloon, and suspended from the roof of the car, midway between the centre and the ends, are two bronze chandeliers of two burners each. By these burners the car is so brilliantly lighted that reading is an easy matter in any part of the car, and the conductor, in collecting his tickets, dispenses with his traditional lantern. Each car takes with it gas enough for sixty hours' steady burning.—*Mining Register.*

The Fastest Train in the World.

THE new express train from Plymouth to London will probably be the fastest train in the world in the part of its journey which lies over the Bristol and Exeter and Great Western Railways. Leaving Exeter at 10.30, it is timed to reach Paddington at 2.45, including a stoppage of five minutes at Bristol, and ten minutes at Swindon; the journey of 194 miles will occupy four hours and a quarter, being at a rate of speed a fraction less then 46 miles an hour, including stoppages of fifteen minutes.

Continuous Brakes.

THE *Engineer*, after commenting on the defects and failures of many of the brake devices heretofore in use, says,

"As it is obvious that the indirect agency by which continuous brakes are applied can not be distributed all through a train, it is clear that some method of uniting the separate systems of brake mechanism into a whole must be adopted. If we abandon the motion of the buffers and the draw bars, what remains to us? In one kind of brake, we have a rod which is caused to rotate under each carriage, and these rods are coupled by a very ingenious universal joint. The arrangement answers very well when trains have not constantly to be pulled to pieces and made up again, but it is troublesome when used under ordinary methods of working main-line traffic. The same objection is brought against the continuous chain. To attempt to treat comprehensively the subject of coupling continuous brakes in such an article as this is quite out of the question. It must suffice to state here that it constitutes the most difficult problem connected with the entire matter. We will sketch here, in as few words as may be, a form of continuous brake which possesses the following advantages, leaving our readers to discover the disadvantages from which it is by no means free. It is worked from the foot-plate automatically the moment steam is shut off; it in no way interferes with shunting; no coupling is required other than that in ordinary use; and, lastly, it is impossible so to make up a train that the brake can be rendered inoperative by negligence. The construction is as follows: Each vehicle is fitted with two sets of flap-brakes. These are actuated by a rod moving backward and forward longitudinally under the frame of each carriage. These rods terminate each in small buffer-plates. When the train is made up, these buffer-plates are in contact from end to end of the train, and they are kept so by extremely simple means. By moving this rod about a foot, all the brakes will be applied, and, as the rod is continuous as far as push is concerned, it will be enough to push it at one end to put on all the brakes. The tender is fitted with a buffer-rod passing through a piston working in a cylinder some two feet long, always full of water supplied from the tender tank. The piston has an aperture in it through which the water flows from one side of the piston to the other when the latter is moved. The rod, prolonged through a second stuffing-box, enters a second cylinder, to which steam can be admitted from the boiler by the merely shutting off steam. Means are provided by which the pistons are always kept at the inner end of the cylinders. The moment the regulator is shut, the steam enters the forward cylinder, and forces out the pistons at a rate determined by the size of the orifice in the water-piston, and with them the small buffer on the tender. This operates on the next, and so on till the brake-bar (as we may call it) has moved through the entire train and all the brakes are applied. The moment steam is turned on again, the steam brake cylinder exhausts, and the brakes are taken off. The water piston is used to secure the gradual application of the brakes without shock. Such a brake as this complies with all the required conditions. We do not assert that it complies with them in the best possible manner."

Telegraphic Signal for Railways.

THE *Manufacturers' Review* says that Mr. William Gillett, of Pittsburg, has invented a simple telegraphic signal, to be used on freight and other trains on railroads for signal purposes, and also to notify engineers and conductors of any accident that might occur to the running gear of any particular car on the train. It consists of an ingeniously arranged telegraphic connection by which the engineer is instantly warned of any accident that may occur to the train. On freight trains it is made to answer the same purpose as a bell-rope on passenger trains, and if one car or even a truck should jump the track, the engineer and conductor are instantly notified of the accident. A passenger train on the West-Pennsylvania road has been provided with the patent signal, and for ten days past practical experiments have been made, and its utility demonstrated.

On the train referred to, the bell-rope has been dispensed with and the new signal used exclusively. We understand that in a few days an opportunity will be given for a thorough test of the apparatus, and that a number of railroad officials will take part in the investigation. We also understand that a train on the Connellsville Railroad will be provided with the signals.

The same journal mentions,

A SIGNAL LIGHT FOR LOCOMOTIVES,

which has just been invented, which promises to act as a preventive of the terrible loss of life and destruction of property attendant upon railroad accidents. The new danger signal consists of an attachment to the headlight of a locomotive, which enables the engineer, by a simple movement, while standing at his post in the cab, to change the ordinary white light. The large reflector in the head-lamp of a locomotive not only throws a powerful light, but when the red glass is raised in front, it produces a bright red halo, which is readily perceived miles away. This invention, therefore, enables the engineer of a train to give a signal of danger that is readily perceived on a straight line at a distance of five miles, and even on a curve the halo which it casts would be discovered by the engineer of an approaching train in time to prevent the occurrence of an accident.

IN London, workmen are carried on the railways ten miles once a day each way for a week for twenty-five cents.

Electric Signals.

THE New-York *Tribune* gives the following description of a railroad signal system invented by Thomas S. Hall, which, it says, has been tested on the Morris and Essex and the New-York and New-Haven roads:

"The system includes a series of devices by which, through the agency of electro-magnetism, an alarm signal is displayed and a bell rung whenever a switch-rail is out of place, a drawbridge open, or a train is approaching a road-crossing. In each instance, the operation of the signal is entirely automatic. Inclosed in a stout box at the point of application to the main line are several metallic rods connected by electrical conductors with a galvanic battery capable of yielding constant currents whenever the circuit is completed. The conducting wires are carefully insulated, and terminate at the signal-station in the cores of two electro-magnets. An armature directly above the electro-magnets acts by means of a lever upon a signal staff and the clapper of an alarm-bell. So delicate is the adjustment of the metallic rods at the point of application, that the displacement of a rail on either side of the main line, or the withdrawal of a bolt that secures a drawbridge, or the passage of a train over the track, is sufficient to connect the poles of the battery and to complete the circuit. The flow of the current vitalizes the electro-magnets at the signal-station, and the armature moves, resulting in the ringing of a bell and the raising of a colored signal. The bell continues to ring and the signal is uplifted until the electric current has been broken by the readjustment of the rail or the replacement of the bolt of the drawbridge. The electro-magnet may be acted upon at a distance of a few yards, or of many miles, so that an alarm may be sounded at any distance from the point of danger, and signals may be displayed in either direction at such distances as to allow the stoppage of a train.

"The apparatus is the same in principle for every application, although there are various devices for operating the signals. The applications are four in number—to switches, drawbridges, and highway crossings, and in what is known as the 'block' system. By an attachment to switch-rails, double warning is given to the eye of the engineer and to the ear of the switch-tender, whenever a switch is opened on the main line so as to endanger passing trains. In the case of drawbridges, alarm signals continue in operation until the draw is closed and the bolt which secures it is replaced. By the block system, the wheels of a passing train come in contact with a series of delicate levers, at intervals of two miles on the main line, each of which closes an electric circuit, by means of which a signal is brought into sight two miles in advance of the train. At the same time, the pressure of the wheels upon another lever breaks the circuit, and the signal at the station which the train is passing falls by its own weight. This system, by which a train registers its position two miles in either direction, is designed to prevent collisions on single or double tracks. In like manner, when a train is a mile and a half distant from a highway crossing, a bell may be rung and a signal displayed, by which teamsters will be given timely warning of the near approach of the train."

To make an improved anti-rust composition, Mr. E. J. Powell, of Birmingham, takes equal parts of Russian tallow and the greasy matter obtained by the distillation of resin oil, and called anti-friction grease. He fuses the said tallow and grease together, in a vessel heated by steam or hot water, and to each 100 pounds of the mixture he adds 2 pounds of mercurial ointment, and 1 pound of lampblack. He first melts and thoroughly incorporates the tallow and grease before adding the other ingredients, and when the whole has been thoroughly incorporated, the composition is either cast into blocks or moulds of a convenient size, or allowed to cool in the vessel in which it is made, and afterward removed.

Risks of Railway Traveling.

AN English paper says, "An Englishman's risk of dying by strangulation is six times as great as of being killed on a railway, whether by his own carelessness or by an accident. If his own carelessness be excluded from the estimate, his risk of death by hanging is 130 times as great. Ninety-nine times as many people die of cancer in England as are killed on railways. Excluding, as before, the element of carelessness, 2165 persons will die of cancer to one killed on a railway. In England during five years, 333 accidents occurred, 200 from collision, 77 from getting off the line, 36 from damage to machinery, and 20 from other causes. For fourteen years, from 1855 to 1869, one person was killed in every 7,161,301 transported. In Prussia, one is killed in 24,411,488, and one is injured in 3,892,998. The statistics of stage-coaches in France, covering a period of ten years, show that one passenger in 355,463 is killed, and one in 29,871 is injured. We have no doubt that something like the same proportions of risk will be found in the United States. In a very large proportion of what the newspapers report as "railway accidents," the disasters, whether fatal or otherwise, are due to the carelessness of those harmed; some by walking on the track, which is unlawful; others by jumping off or on the trains while in motion, or in defiance of some other railway regulation made by the companies for the protection of passengers. The nerves of passengers are badly shaken by reading these accounts of railway disasters, while in fact they have no more to do with the legitimate perils of railway *traveling*, than they have with balloon traveling. As the road-beds are improved, better material used in the rolling stock, and more strict discipline is enforced in the running regulations, the perils of railway travel in the United States will decrease, until they reach something like the Prussian standard, or even better, perhaps."

Great Western Railway Cars.

TWO new palace cars built by the Taunton Car Company were last week placed on the Great Western Railway, to make daily trips between Hamilton and Suspension Bridge. The Hamilton *Times* gives the following account of them: "Each car is 62 feet long, and is divided into five compartments: one large drawing-room, which will comfortably accommodate 20 persons; two state-rooms, seated for six passengers each, and one room at each end of the car which may be used as a smoking-room. The easy arm-chairs in the latter are cushioned and incased in turkey morocco; the movable chairs and settees in the drawing-room and state-rooms are in like manner enveloped in velvet plush, while the interior wood-work of the car is finished with gilding and rosewood veneering, in the highest and most costly style of the art. The windows are of the clearest French plate-glass, 27x28 inches in size, and so numerous as to suggest a crystal palace. In case of a smash-up, the chances for egress may be considered good. In addition to the usual improved devices for heating and ventilating, providing with water, lighting with gas, etc., the partitions are so arranged that they may be closed or withdrawn at pleasure; while persons may readily pass from end to end of the car without going through the central apartments, but through a side passage for that purpose. In short, with the exception of a cupola, wine-cellar, park and kitchen garden, nothing seems to be wanting to make the car in reality, as it is in name, a palace. "Leo" and "Mars"—for these are the pet names of the palaces—will not only outstrip all ordinary rivals on wheels, but may run a fair competition with the floating palaces on the lakes. The passion for travel is bad enough already; but if this multiplication of railroad conveniences is to be carried much further, home will lose half its attractions, and no one will stay there who can afford to buy first-class comfort for three cents a mile."

Warming and Ventilation of Railroad Cars.

CONTINUED.

IN our last article on this subject, we showed that with the ordinary manner of warming and ventilating cars, there is often a difference of from 40° to 50° in the temperature of the air at the floor and at the roof, and that this difference is caused by the admission of cold air into the car, and exhausting the warmed air from the top. We have also shown that it is impracticable to admit any considerable quantity of cold air without much discomfort to the passengers. Supposing, now, that instead of admitting the air either under or above the door, that we open the window *A*, Fig. 6, immediately in front of the stove, and close the inside blind. As we have explained before, when the car is running in the direction indicated by the dart, the air will enter through the window, and will receive an upward direction from the slats in the blind, and as it passes over the stove will be warmed; and the current being directed above the heads of the passengers, no draught or cold air will be felt by them. If the ventilators *v, v, v* in the roof are now opened, the warmed air will at once escape through them, especially if, as is often the case, they are so arranged that the car creates a considerable exhaust-current. The cold air in the bottom will thus remain undisturbed, very much to the discomfort of the passengers. If, now, we close the ventilators at the top, and make an opening under the back-door *B*, Fig. 7, the partial vacuum behind the car, produced by its motion, will cause an outward current *at the bottom*, thus exhausting the stratum of cold air, while the warmed air will gradually take its place. As there is usually no provision by which an opening can be made below the door for the escape of the air, we must resort to the next best thing at our command, which is one of the rear windows. By opening that so as to allow the air to escape while admitting it at the front window, a car can usually be ventilated tolerably well. Closing the blinds hides the fact that the window is open, to which and to fresh air many people seem to have the same antipathy that mad dogs have to water. Where no other good arrangement is provided, this can be resorted to usually with good results. It requires, however, considerable persuasive power to influence the conductors to adopt this plan. They and the brakemen are usually ignorant of the fact that a car can thus be ventilated, and at the same time be kept comfortably warm. As a very inexpensive and, to a certain extent, effectual method of improving ventilation in cars which have no provision for supplying fresh air, we suggest the posting of a card over the end windows with the following instructions in conspicuous letters:

TO VENTILATE THE CAR IN WINTER.

Open the Window in Front of the Front Stove, and the One behind the Rear Stove, and CLOSE *their* BLINDS.*

This plan of ventilating we have tried, and have found it to be quite effectual under most circumstances. It is, as we have said, often difficult to induce those who have charge of the cars to try it; but by delivering very popular lectures on the subject to the brakeman, we have nearly always been able to prevail on him to make the experiment. If authoritative instructions were given them in the way proposed, it would no doubt, at least help to bring about some improvement, where now it is so much needed. It would, however, only relieve the evil, and not be a cure. There are times when it would not be effectual; as, for example, when there is a very strong and unfavorable wind, or during a heavy snow-storm, it would be objectionable. In dry weather, much dust would be admitted, and as the opening of the windows is

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*This suggestion is made on the supposition that there are two stoves, one at each end of the car.

dependent upon the discretion of the brakeman, or other attendant, it is apt to be neglected. There will often be passengers who will either close them, or object to their being open, and as soon as the fire in the stoves burns down, and the car grows cold, they will insist upon having the cold air excluded. We have, therefore, after a good deal of observation, concluded that no system of warming and ventilation will be effectual, unless the admission of fresh air is independent of the control of the passengers and those who have the care of the cars. There is, at the present time, not a sufficient amount of appreciation of the importance of ventilation among average people to induce them to give the requisite attention to any device which requires either their care or consent; and it is certain that from $60 to $70 per month—the usual wages of brakemen—will not procure "hands" supplemented with a sufficient amount of hygienic knowledge to enable them to realize the importance of always breathing pure air. Therefore, the arrangements for supplying it must be entirely independent of their care, neglect, or ignorance. There is no available power, either in our present educational system or anywhere else, so far as we know, to dispel the prevailing error, which is so common, namely, that no fresh air is needed so long as a room or car is cold. That cold air may be fatally impure, is a truth which, we suppose, may be universally believed in some future millennial period; but so far as our relations to the present subject are concerned, it may be assumed that this ignorance is one of the unalterable elements of the problem. The fact that people might, could, would, or should know better, ought not to influence us. The broad and very palpable fact is, they *do not know better*; nor is there any reason to think that in the aggregate they will, in our time at least, be better informed on the subject. We must, therefore, adopt some means for both *supplying* and exhausting a sufficient quantity of air, which will be entirely automatic, and arranged so that it will be impossible to shut off the supply. There must at the same time be ample provision for warming it, and as any considerable current, either warmer or colder than 70° is unpleasant, the supply should, as far as possible, be distributed in small quantities through the whole car. If it is not, the persons who are nearest the place where it is admitted will be either uncomfortably warm while others are too cold, or *vice versa*. Besides this, many persons have a mortal fear of a "draught," as though a current of air were laden with deadly poison. There is, of course, under this feeling some basis of truth, as there is in most error; but the people who have the dread lose sight of the other fact, that in the air "death lurks most where stagnation reigns supreme."

In the ventilation of buildings, two systems are used for producing a movement of air. In one it is produced by forcing the supply into the room by mechanical means—such as a "blower" or fan—and leaving it to escape by apertures, which are either accidental or are provided for the purpose. This is called the *plenum* method.

In the other system the movement is created by *exhausting* the air, and this is called the *vacuum* method. A current is produced by the natural tendency to rise which warm air has. The power which it will thus exert is in proportion to the height of the column, or of the flue or duct in which it is contained. As in most cases it is impossible to have a flue extend more than a few inches above the top of the car, this latter system can not be used on railroads, and the complication of mechanical means, such as fans, or blowers, for forcing air into a car, would be an insuperable objection to their use. Fortunately, the motion of a car furnishes abundant means for creating either a "plenum" or "vacuum" movement in the air. Therefore, in nearly every plan thus far put into practice, this power alone has been used for exhausting the air, and also for supplying it where any provision at all has been made for the latter purpose.

A description of all the devices which have been used for exhausting air from cars would fill a large book, and though it might be interesting as illustrating the ingenuity of the contrivers, it would assist us very little in learning how to keep the air pure; for the reason that nearly all of them were based upon the idea of taking the air out of cars, *without putting any in*. There is not much trouble in getting air out of a car, if there is an abundant supply admitted. The difficulty is chiefly in supplying the air so as not to be disagreeable to the passengers.

Fig. 6.

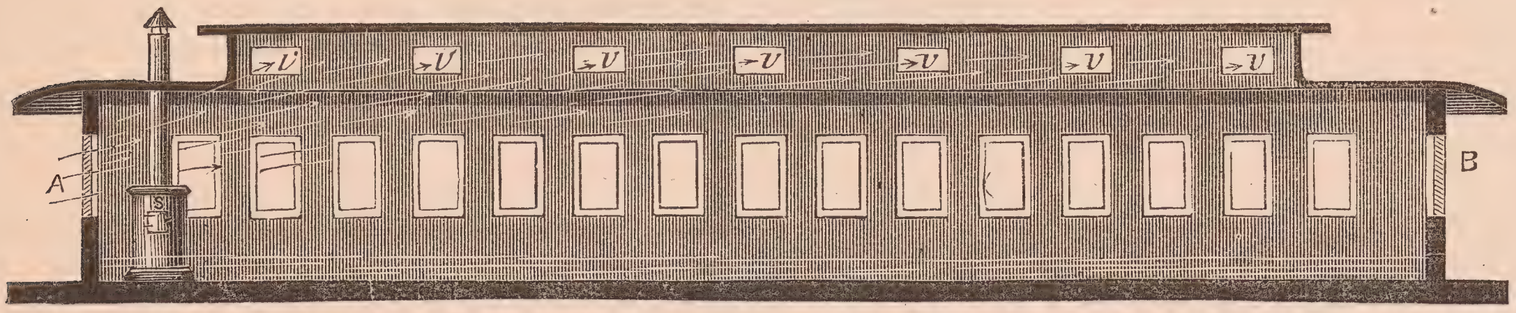


Fig. 7.

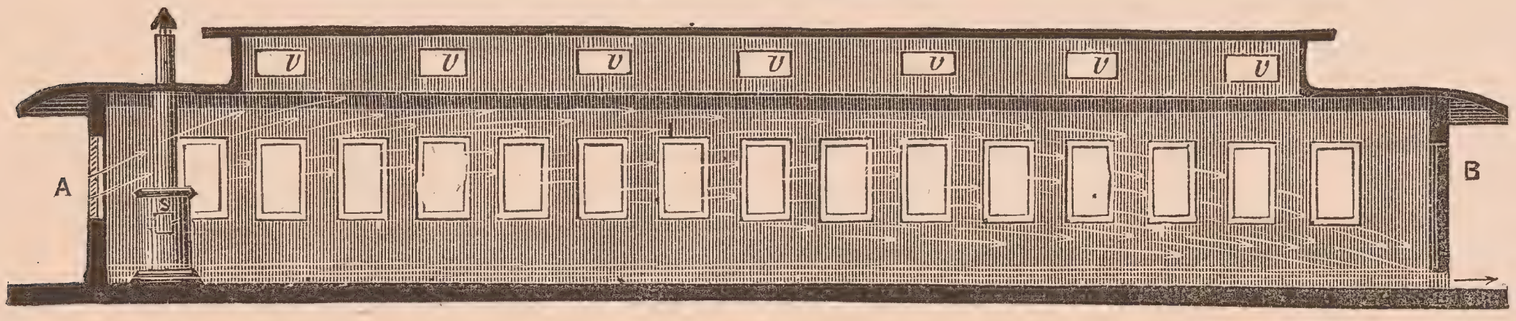


Fig. 8.

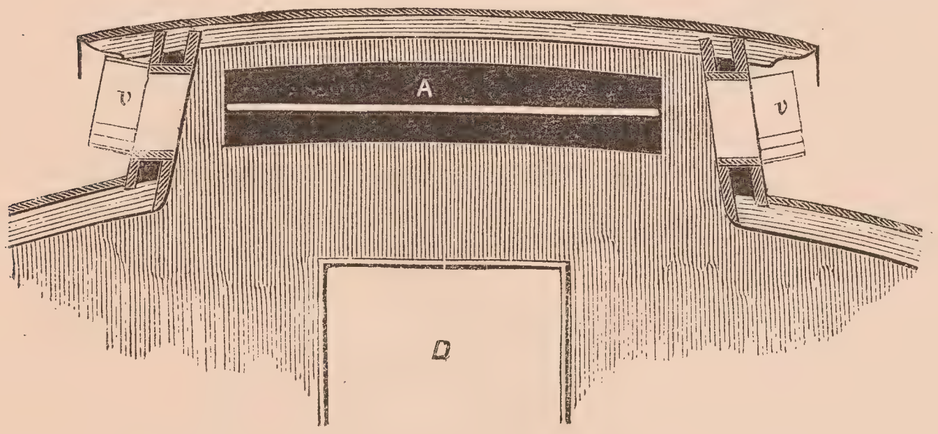
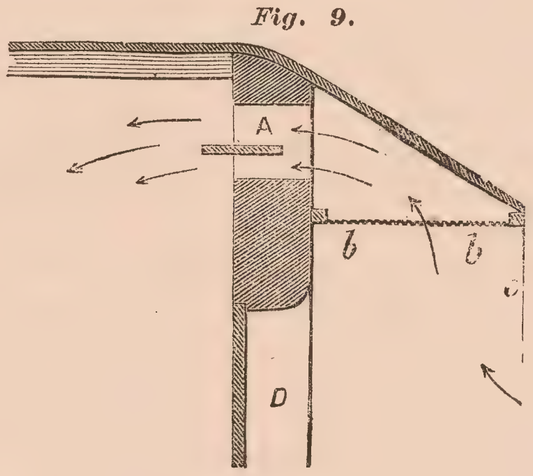


Fig. 9.



The objections to admitting the air through the front windows have been referred to. In dry weather, the dust which rises between the cars would be very disagreeable, if the air was taken in at the window over the platform. A plan shown in Figs. 8 and 9, now used on the New-York and Harlem, New-York Central, and other roads, avoids this difficulty to a considerable extent. Fig. 8 is an end view looking from the inside of the car, and Fig. 9 a longitudinal section showing the arrangement. The raised roof is carried out over the platforms, and has an opening *b b* covered with wire-cloth. It communicates with the inside of the car by another opening *A*, which can be closed by a door, pivoted or swung on its centre. *C* is a sheet-iron apron around the projecting roof. The opening *b b* is so high above the platform that very little of the dust rises up to it, and it is protected from the cinders from the engine by the apron. The wire-cloth is also supposed to exclude some of the dust and cinders. At least, the heavier particles of the dust will not rise with the current of the air, and are thus excluded. The door *A* swings on its centre, and can, of course, be opened and closed at pleasure. The motion of the car creates an inward current at the front end, and an outward current from the rear end, thus creating a movement of the air through the whole length of the car. In comparatively mild weather this would answer excellent purpose; but when the temperature outside is down to the freezing point, or below, very few of the passengers, especially those near the front end of the car, would tolerate having these ventilators open. The air which enters at the window in front would fall on those near it with a sharp, chilling sensation, which would be very disagreeable. It, therefore, can not be depended upon as a means of supplying air at all times, but as an auxiliary for admitting cold air at one end, and exhausting hot air at the other when the car is too warm, it serves a good purpose, even in the coldest weather. This plan is used on many of Wagner's cars on the New-York Central, and has just been adopted by the New Jersey Central, New-Jersey Railroad, and Transportation Company, the Erie, and other roads. Where this arrangement is used it would be a good idea, we think, to paint in large letters over the door *A* the first line of the inscription given below, and on the door itself the injunction which follows, so that when the door is closed it would read:

IF THE CAR IS TOO COLD, CLOSE THIS VENTILATOR.

But if you want to breathe
PURE AIR,
Request the Conductor to Open It.

So long as the ventilator is open, the portion of the inscription on the door will be out of sight; but as soon as it is closed, the injunction will be seen of all men. Our impression is that with this device, if conductors did not habitually keep the ventilators open, they would be made quite unhappy by the clamor of passengers.

Many of the old Woodruff sleeping-cars had a sliding sash in the door, which is better than no provision at all for admitting air, but is very apt to be troublesome on account of dust. But the quantity of air admitted by either plan will vary very much. With a strong side wind, or one blowing in the same direction in which the train is running, very little air will enter the car, while if it was blowing directly facing the train, *too much* would come in, especially in cold weather. The fact that all the air which enters the car by this means is cold, is the great objection to both these plans, if they are the only means of supplying the car.

As we have pointed out before, it will be impossible to admit the requisite quantity of air into a car (1000 cubic feet per minute) in very cold weather without much discomfort to passengers, unless the air is warmed before it enters. Of the means for doing this we will speak in our next.

The National Car-Builder,

PUBLISHED MONTHLY,

BY

VOSE, DINSMORE & CO.,

1 Barclay Street, New-York,

AND

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Terms, 50 cents per Annum.

Editorial Announcements.

Correspondence.—*We cordially invite the coöperation of the railroad public in affording us the material for a good mechanical paper. Articles relating to rolling stock and machinery, by those practically acquainted with those subjects, will be gratefully received. All communications must be addressed to Vose, Dinsmore & Co., No.* 1 *Barclay Street.*

The name and address of the writer must accompany all communications designed for publication.

Advertising Rates.—*For one square, or one fifth of a column,* $5 *per month, or* $50 *a year. For half a square,* $3 *per month, or* $25 *a year. Larger advertisements by special contract.*

All communications in regard to advertising should be addressed to L. F. Dinsmore, *Post-Office Box* 4055, *New-York City, who is our agent for advertising, and authorized to make contracts, collections, etc.*

Engravings and Illustrations.

We would invite the attention of Master Car-Builders and others to the advantages to be derived from publishing in The National Car-Builder *engravings designed to illustrate the various features and details of car construction, and especially such improvements as can not otherwise be clearly presented. We will procure cuts to be made in the best manner from drawings or models that may be sent us, and charge only for the cost of engraving, inserting the same in our paper with suitable descriptive details, without charge. The cuts thus made by us, or that may be sent us for use in* The National Car-Builder, *will of course be returned promptly to the owner.*

To our Patrons.

This being the twelfth number of The Car-Builder, which completes the first yearly volume, we deem it a fitting occasion to tender our acknowledgments to our many readers for the support and encouragement they have so liberally extended to our enterprise, and to solicit a continuance of their favor by a renewal of subscriptions which expire with the present number. Since our first issue, our circulation has steadily increased, and we flatter ourselves there are but few car-shops or railway-offices in the country to which The Car-Builder is a stranger. Our aim has been and will be to gather from all available sources information pertaining to railway rolling-stock, and especially to car-construction in its many details, and to illustrate with engravings such devices and improvements as may be deemed important and valuable. We scarcely need remind our readers of the merely nominal price of subscription, as an inducement for them to aid us in extending our circulation by sending us club-lists, which enables us to send packages to one address. We have on hand a limited supply of back numbers for several months past.

We also beg to acknowledge the many favors of our advertising friends. The Car-Builder being a publication which reaches the hands of purchasing agents and managers, as well as those more immediately connected with railway mechanical departments, is a valuable medium for advertising to supply-dealers, manufacturers, and others. Our rates are reasonable, and in a typographical point of view our paper is not excelled by any other of its class.

Master Car-Builders' Association.

The fifth annual meeting of this association will be held at Richmond, Va., on the fourteenth day of the present month, and we trust there will be a full attendance. The members of the organization collectively represent one of the most important branches of mechanical industry in the country. The construction of railway rolling-stock has already reached a degree of completeness corresponding with the magnitude and extension of our railway system. The best inventive skill has been brought to bear upon it, and is constantly being exerted to make it better than it is. There does not seem to be much margin left for improvement in locomotives; but as regards freight and passenger cars, the goal of perfection is still a short distance ahead. Difficulties are yet to be overcome. New devices and methods will, one after another, supersede or modify those now in use. The railway system has hitherto been one of constant progress and ever-increasing development in its departments of construction and equipment, and it will continue to be subject to this law in common with all the other great features of modern civilization.

In promoting this progress, the advantages derived from association are obvious. The interchange of views and opinions, especially when they are various and conflicting, can not be otherwise than beneficial to all concerned. New ideas are developed and old ones modified by contact and discussion, prejudices uprooted, sharp angles rounded, and rough edges smoothed. The old maxim holds good, that in a multitude of counsel there is wisdom—more or less. Every individual member of an association representing important interests and meeting but once a year should feel bound to contribute something to the general fund of information, so that all can go away wiser than they came; and it should be the duty of all the delegates collectively, in their organized capacity, to examine and systemize these various miscellaneous contributions, and thus give them shape and permanent value. If this is not done, or if it is done in a slipshod way, and without that thoroughness resulting from hard work and earnest effort, the benefits derived will be correspondingly trifling and unimportant.

The last annual meeting of the association in this city was well attended, and in many respects highly satisfactory to all who participated in its proceedings. The delegates came from every part of the country, the best of feeling prevailed, new acquaintances were made and old ones renewed. The social element, stimulated and quickened by a generous hospitality, gave a zest to personal intercourse, and made the occasion one to be remembered rather as a pleasant reunion than as a mere assemblage for the formal transaction of business. The restraints of parliamentary decorum and the conventional usages of a deliberative assembly were agreeably alternated with social recreation and convivial enjoyment. From the official report of the proceedings, it does not appear that any definite and final action was taken upon any important matter pertaining to car construction; but a good deal of preliminary work was done in the way of suggestion and inquiry. A number of committees were appointed, and special subjects assigned to each to be investigated and reported upon at the next annual meeting. These committees have not been idle, and we have reason to believe that their forthcoming reports will embody much valuable information in the shape of facts and conclusions that will be of service, not only to car-builders, but to all connected with the management of our railroads.

There is at present much diversity of opinion in regard to the material and mode of construction of almost every distinctive feature of a railroad car, and this results mainly from the lack of well-digested information derived from carefully ascertained facts, data, and statistics. Trucks, wheels, axles, brakes, springs, lubrication, ventilation, lighting, heating, etc., are all, more or less, the subjects of controversy. This being the case, it is extremely desirable that some approximation be made toward greater uniformity of opinion and practice, and that such uniformity should result from reliable evidence and practical test. The association of master car-builders can do much in the way of accomplishing this. Its members are practical mechanics, accustomed to deal with facts instead of abstract theories, and if their deliberations are characterized by sound judgment, patience, industry, and thorough investigation, the ends and purposes of the organization will be more than realized. We are glad to notice that railroad superintendents and contracting car-builders are invited to be present and occupy seats in the coming convention. We trust the invitation will be responded to, believing that their advice and coöperation will contribute to the interest of the proceedings and materially aid in promoting the objects of the meeting.

We hope to be able to publish a full report, or at least a summary of the proceedings, in our next number.

The Car-Truck.

Of the myriads of people who travel by rail, how very few comparatively have any correct notion of the mechanical appliances pertaining to an ordinary passenger train, or of the labor and skill employed in perfecting and harmonizing the numberless details that combine to produce the grand result. The completeness of the effect makes us lose sight of the instrumentalities which lie behind it, just as the dial of a good watch hides the delicate and complicated mechanism underneath, or as a statue artistically faultless obliterates all traces of mallet and chisel. It is only when the time-piece is unfaithful to the hour, or when the statue is false to the ideal conception of what it should be, that we arraign or examine the handiwork of mechanic or artist. The traveler, seated in an arm-chair or reclining upon a lounge of the drawing-room pattern, reads the news, or surveys the scenery, or contemplates the floral bouquets in the pattern of the carpet, or resigns himself to a quiet nap, while he is swept along with the speed of a bullet, and with scarcely a thought of the intricate and powerful machinery underneath the flimsy flooring of the vehicle in which he sits. Probably not more than one in fifty of the general run of passengers know what a car-truck is. The various parts which constitute it, and their mutual dependence, the skillful adjustment and harmonious working of every detail so absolutely essential to comfort and safety, are seldom thought of unless something goes wrong; in which case the survivors not unfrequently console themselves with the assurance that lightning never strikes twice in the same place. A superficial glance at the visible part of this indispensable adjunct of a car is apt to excite a momentary wonder how such a complicated affair, made up of so many pieces, can possibly hold together while sustaining such a weight, and moving with such a headlong speed for hundreds of miles with scarcely an interval of rest. The reciprocal relation of axle and wheel, and the connection of these with the stanch frame-work supporting the body of the car, the nice adjustment of the bearings and their proper lubrication, the elastic and powerful springs to temper the force of concussion and sustain with an easy motion the superincumbent weight, the brake-beams and their connections of rods, levers, and chains, the numerous bolts, nuts, braces, and fastenings—all combine to make in the aggregate the peculiar piece of mechanism called a truck, two of which are placed under every car. The number for each passenger train will range from twelve to twenty; and when we reflect how they go rushing and tearing along, by switches and turn-outs, around curves, over bridges and crossings, in obedience to the limitless power of steam—which has not inaptly been called an earthquake in harness—it is indeed wonderful how the thing manages to escape going to pieces and piling itself and the whole train in a heap of promiscuous ruin. The least derangement or breakage would in-

stantly involve the adjacent parts, and these others more remote, and all so quickly that the catastrophe in its suddenness comes like a thunderbolt.

But in view of the aggregate number of trains running, and these multiplied by the average number of cars in each, and these again by the average number of passengers, how small relatively is the number of accidents that occur, and smaller still comparatively is the actual loss of life. What a testimony is this to the mechanical skill displayed in devising and perfecting this one feature of car-construction—the truck—an appendage which attracts so little general notice as compared with what is bestowed upon the more bulky but far less substantial car-body, with its superficial attractions of elaborate and showy ornamentation!

Third Avenue Palace-Car.

THE insufficient and inferior accommodation afforded by our city street-cars has become a subject of very general complaint. The enormous and constantly increasing passenger traffic, especially on the leading avenue lines, is out of proportion to the capacity of the rolling-stock. At certain hours of the day, when the tide of travel sets up or down town, every car is excessively overcrowded, and this almost necessarily causes a lack of cleanliness, and of other requisites of comfort. For the accommodation of such as are willing to pay higher fares to secure exemption from these drawbacks, the Third Avenue Railroad Company have placed on their line a very elegant car, fitted up in drawing-room style, and presenting a marked contrast as compared with the ordinary cars. Whether a car of this description is in all respects the most suitable, and whether its success thus far in securing its full complement of passengers is a proper criterion to warrant the introduction of similar ones on other lines, is a point which it is not our province to discuss, our design being merely to give a brief description of the vehicle, which is a novelty in its way, and in all respects highly creditable to the designer and builder, Mr. E. S. Dickinson, the superintendent of the line.

The extreme dimensions of the car are twenty-six feet long by eight wide, and the inside eleven feet wide by six high in the clear. The entrance is at the rear end by a double door three feet in width. There are no platforms at either end. The driver occupies a small niche, which is entered by a side-door, and is inaccessible to any one but himself. The two ends of the car are each in the form of a half-circle. It runs on a four-wheel truck equipped with Higley's patent running-gear and brake, and elliptic springs. The fitting-up of the interior corresponds in all its details with that of the best style of drawing-room coaches. There are seventeen revolving chairs and also twelve sofa-seats, the car seating in all twenty-nine persons. The floor is covered with Wilton carpet, and the chairs and sofas upholstered with moquette tapestry. The windows, nine on a side, are of plate-glass, each consisting of a single pane, thirty-six by thirty, and furnished with curtains of crimson damask. The ornamental wood-work, roof-lining, etc., are exceedingly tasteful and appropriate, the former consisting of bird's-eye maple, walnut, ebony, and other varieties. The metal-work is nickel-plated. The car is lighted by two lamps placed over head on a line with the ventilators. There are also signal-lights at each end of the car on the outside. Ice-water is supplied from a reservoir over the head of the driver. The interior fitting-up, including furniture, etc., cost about $2600, and the entire car nearly $5000.

These are substantially the leading features of this novelty in city locomotion. It is creditable to the enterprise of the company and the taste and skill of the builder, and we trust will prove to be the beginning of a lasting and much-needed reform in our modes of city conveyance.

A. T. STEWART'S income is $2.92 per minute.

Correspondence.

BOSTON, May 25, 1871.

EDITOR OF THE NATIONAL CAR-BUILDER:

DEAR SIR: I recently had occasion to take a trip over the deservedly popular route between this city and New-York, known as the New-York and Boston line, *via* New-Haven and Springfield, of which the Boston and Albany road forms the eastern division, and was pleased to notice the many improvements that have been introduced to promote the comfort of passengers and augment the luxury of traveling. My attention was more particularly attracted to the sleeping-car department, which is under the special direction of Mr. James Parker, who is widely known as one of the oldest and most popular conductors connected with the numerous trains that run to and from this city. He has now twelve sleeping-cars in all, and runs three or four regularly on each train, and occasionally five or six. Four of these have been recently put upon the road, and are from the shops of Osgood Bradley, at Worcester. They are in no respect inferior to Pullman's best, and are creditable to the enterprise of the road as well as to the taste and skill of the builder. Two of them are finished in rare and beautiful woods. One is called the "Rip Van Winkle," and is ornamented with pictures and designs illustrative of his well-known career. The other three are named "Governor Lincoln," "New-England," and "Manhattan," and are appropriately ornamented with pictures representing scenes in New-York and New-England history. Each of them is elegantly upholstered. The seats are made in the sofa style, running along the sides, which is the most convenient arrangement for changing into beds. Each of the mattresses contains twenty pounds of best curled hair, and the general furnishing is sufficiently rich and tasteful to satisfy the most fastidious. Any one who craves the luxury of a good bed and correspondingly pleasant dreams at a speed of forty miles per hour can be gratified by taking a trip on this line. In every requisite of comfort and convenience these cars are models of their class, and their appearance on this road is a marked event in its history, and deserves and will receive the approbation and encouragement of a discriminating public. The night-train between Boston and New-York carries more passengers than any other train on the road, and the profits of the sleeping-cars alone are said to be highly satisfactory.

I also noticed on this line a number of very fine day-coaches which have been placed upon the Boston and Albany division within the past year, and we question if any more beautiful cars of this class can be found upon any road in the country. They were built at the shops of the company, for their own service and by their own men, and are replete with every requisite of safety and convenience. I can not refrain from making special mention of the last two turned out by these shops, and numbered respectively 116 and 117, as embodying many noticeable devices and improvements, one of which is a wicket-window at each end of the car near the top, and so arranged that they can be opened more or less to admit fresh air. They are protected on the outside and over the platform by a deep hood or screen, which prevents dust and cinders from entering. A thorough ventilation is by this means secured, the vitiated and impure air being constantly driven out and replaced by the current entering through the window. The interior finishing is exceedingly beautiful, consisting of ornamental woods, including the California red-wood, which presents a singular and unique appearance. They are furnished with Buntin iron seats upholstered with fine crimson plush. The trimmings are of bronze metal. I understand the road is to be equipped with more of these cars at the rate of one or more per month, all of which will be built at the company's own shops.

TRAVELER.

Pacific Railroad of Missouri Shops.

ST. LOUIS, Mo., May 25, 1871.

EDITOR OF THE NATIONAL CAR-BUILDER:

DEAR SIR: As this city is getting to be one of the most important centres of railway enterprise and activity in the country, I send you a few notes descriptive of the shops and mechanical departments of one of our leading lines of road, thinking it may not be without interest to some of your many readers.

The Pacific Railroad of Missouri is one of the oldest railroad corporations in this State, and the first to place St. Louis in communication with the western portion of Missouri and the flourishing territory west and south of Kansas City. In fact, it was the first railroad west of the Mississippi River. The entire line was brought into active operation from St. Louis to the State line of Kansas as early as October, 1865. The main line now operated is 329 miles, exclusive of a branch of 25 miles.

The shops of the company are located at St. Louis, Jefferson City, and State Line, those at the two last-named points being devoted mainly to repairs, while those in this city are the general machine and car-shops of the road, and to which it is my purpose more particularly to refer. They are situated directly north of Chouteau and west of Summit avenues. The grounds fronting upon these streets comprise about fourteen acres, and upon this area are the various buildings which together constitute the St. Louis shops. Mr. Jacob Johann, master mechanic, has the entire charge of the mechanical department of the road, and is admirably fitted for the responsible position, having had long experience in this branch of railway management, and being in all respects a thorough and skillful mechanic. He has assigned competent assistants to each department under his control, who conduct, under his general supervision, the various operations pertaining to locomotive and car construction and repair. Facing east, and close to the main track, is the store-house, a commodious building, 100 feet long by 30 wide, and two stories high. The front part of the first story is occupied by Mr. Johann as an office, including the telegraphing facilities now considered so indispensable to railroad men. Back of this office is a store-room for the heavier articles used by the road, while on the second floor nearly the same space is occupied in storing lighter material. In the back part of the upper story is a room of ample size where all the upholstering is done, while in front is a large, well-lighted apartment, completely furnished with all the facilities for drawing. This room is in charge of the skillful draughtsman, Mr. H. Guels, who furnishes the working drawings by which the different parts of machinery are constructed. There is also on this floor a sleeping-room for the telegraph operator, who can be called to his instrument by a patent alarm at any hour of the night, an arrangement which dispenses with a regular night operator.

About sixty feet north of this store-house is the paint-shop, 325 feet long by 28 wide, and capable of sheltering for work six cars at a time. This department is in charge of Mr. G. Forby, who displays much taste and skill in the decoration of passenger and other cars sent to his long shop. Directly in the rear of the store-house is a large shed, 150 feet long by 40 feet wide, used in repairing freight-cars. This and the paint-shop are the only important buildings that are not constructed of brick. They are both, however, very substantial frame buildings.

Going south from the store-house we come to the smith-shop, 150 feet by 40 feet, with ample capacity for turning out all the forgings required by the road. From this we go into the machine-shop, which is two stories high. Here is where locomotives are built. The first floor is the erecting-shop and the second floor the finishing-shop, and this is supplied with every variety of tool used in the manufacture of the lighter gearing of locomotives. All these machines are of the most improved description; but the most interesting of all is a milling-machine, designed by Mr. Johann, and which is a great improvement upon all other ma-

chines of the kind. It is certainly one of the most complete and successful labor-saving devices that has yet been discovered. Just outside of this shop, and elevated above the roof, is a large water-tank, kept constantly filled as a precaution against fire, and capable of flooding the entire building in case of need.

The boiler-shop is 110 feet long by 55 feet wide, and thoroughly equipped with the massive machinery and implements required for the noisy work. Adjacent to this are the engine and boiler-rooms. The engine is 100 horse-power, and every part of it as polished and clean as if it were a model one for exhibition, while the room and every thing in it are correspondingly neat and tidy. Still further south from the boiler-shop are two smaller buildings, one used as a brass foundry and the other as a tin and copper smith-shop. Directly east of the smith-shop is the car-builder's shop, 100 feet by 50, with a wing extending over a hundred feet south, in which are placed all the wood-working tools needed in dressing material used in constructing cars. This shop is under the superintendence of Mr. John D. Shaffer, a veteran in the service of the road. West of the machine-shop is the round house, containing sixteen stalls. This and the machine-shop are in charge of Mr. M. Dietrich, assistant master mechanic. The several tracks from the stalls of the round house converge and meet at the turn-table, about a hundred feet west. Near by are the oil-house and shed for boiling oil, also a small building used for repairing wood-work about locomotives. There are two coal-bins conveniently located and capable of holding 30,000 bushels. The water-tank near the main track holds 30,000 gallons. The supply of water is one of the most impor tant points to be considered in the location of machine-shops, and in this respect the St. Louis shops of the Pacific Railroad are particularly fortunate. Some sixty thousand gallons are used at the shops daily, all of which is supplied by one never-failing spring on the premises. The people of the neighborhood also have access to the spring through the liberality of the company.

There are eighty locomotives in use on the road. The total number of passenger, caboose, and freight-cars is 1210, half of which have been built at these shops, which employ a force of 600 men. Every thing in and about the shops indicates good order and systematic management, and altogether they are highly creditable to the enterprising spirit of the company, the capacity of its officers and employees, and also as an evidence of the growth and prosperity of the great central city of the continent. We are indebted to Mr. Barnes, the gentlemanly and obliging accountant in Mr. Johann's office, for many interesting details concerning the road. There are other equally interesting shops connected with the other roads which centre here, and which will be noticed at a future time.

MISSOURI.

Tunneling the English Channel.

IT is proposed to lay down a cast-iron tube for railway purposes between England and France. The tube would be commenced at one side of the channel and laid at the bottom of the sea, being built up inside a horizontal cylinder or bell, to be constantly pushed forward as the building up of the tube proceeded. The line selected for the tube to be thus submerged is close to Dover, on the English side of the Channel, and would extend to Cape Grisnez, on the French coast, the distance between the two points being twenty-two miles, and the average depth of water one hundred and ten feet. According to this plan, the tube would be made large enough for the passage of railway carriages of ordinary construction, while the traffic could be worked by pneumatic pressure, thus securing a constant supply of pure air, and at the same time precluding the possibility of a collision. It is estimated that a slow train will be able to accomplish the distance in one hour and six minutes, but an express train in forty-six minutes. Five thousand passengers and ten thousand tons of goods could be conveyed through the tube daily.

The Wood Frog.

THIS simple contrivance seems to be a success, and worthy of general adoption. It is the patent adjustable railroad frog of Mr. Joseph Wood, of New-York.

It is self-acting and subject to the smallest amount of wear and tear. The rails are made of steel or wrought-iron, according to order, and are securely riveted together, and so arranged and combined with the bed-plate as to move freely to either side as required. The central tongue is forged iron or steel and may be made of rails, and the bed plate wrought-iron, and of such thickness as will effectually secure stability. The frog meets all the requirements of railroad service: First, by presenting a *continuous rail* to the wheels passing through it, thereby avoiding that concussion, jarring, and strain which is unavoidably associated with the frogs of other construction, and which is so injurious to the rolling stock; secondly, by its simplicity of construction, no springs or catches being used. It is opened and set by the first wheel that passes through it, in which position it remains until reversed or changed by a passing train or car upon the other track. It is better adapted to compromise gauges than other forms of frog in use; and thirdly, by its superior durability, it is as serviceable in winter as in summer. It has been extensively tested by the Camden and Amboy, New-Jersey Transportation, and the Philadelphia, Wilmington, and Baltimore railroads. Full particulars can be had upon application to S. W. McMullin, General Agent, No. 423 Walnut street.—*Mining Register.*

Wrought-Iron Railway Sleepers.

THE new railway sleeper recently patented by Mr. Richard Gammon, of Westbury, England, is likely, it is said, to supersede the whole of those at present in use, especially in tropical countries. The constructors of the railways in India experience the greatest difficulty in making and maintaining the permanent way. The dry rot, and those pests of India the white ants, destroy every thing. Sleepers sent from England creosoted and "pickled" are not protected from the influence of the sun and vermin, and seldom or never last more than three years. It was necessary, therefore, to find a substitute impervious to attacks of insects, which might be made perfect and ready to be laid down wherever they should be required.

Mr. Gammon's sleeper is made up of a number of webs and plates of rolled iron, riveted together, and pierced with bolt-holes for the chairs. This saves about two thirds of the labor of laying, and leaves but little work to be done by native or other labor. The direct cost is not more than 1 shilling each above that of the best wooden sleepers, and they are calculated to last ten times as long in tropical countries, and three times as long in Europe. Many eminent engineers and railway contractors, who have examined them, believe they will be the railway sleepers of the future. At all events, the invention is highly ingenious, and likely to supply a great want.—*Scientific American.*

New Cattle-Cars.

A TRAIN of 11 of Stuart's palace stock-cars were loaded at St. Louis on April 28th, with 170 steers, and left, *via* the Indianapolis, Bellefontaine, and Pennsylvania Central Railroads, direct for the Communipaw yards, New-York. This is the first full train of these cars ever loaded, and the event is regarded by railroad and stock-men as a very interesting one in the shipment of live stock. The cars were loaded in from six and one half to ten minutes each, and will reach New-York in 96 hours. The cattle will be fed and watered in the transit. The old mode of shipment required 240 hours for the same distance. If this shipment proves successful, a company will be formed in St. Louis for building cars, and operating them on the roads west of there, to accommodate the great cattle-trade of Texas and Kansas.

St. Louis Bridge Completed.

THE great steel bridge across the Mississippi River at St. Louis was completed on the 11th of April. This bridge is one of the greatest mechanical structures in the country, having 11 piers, 2 abutments, and the largest draw-span in the world, being 384 feet in length, and costing $1,000,000. The bridge contains two roadways, one for the railroad tracks, and one for foot and wagon travel. In addition to the draw-span are two spans 250 feet wide in the centre, to admit of the passage of rafts. The completion of this bridge will greatly facilitate trade in St. Louis, which city is fast assuming great importance as an iron manufacturing centre, and which already surpasses Chicago in the extent of its grain trade. With uninterrupted rail travel with the Atlantic and Pacific, and unbroken water communication with the Gulf, St. Louis must perforce become the largest central city on the continent. The development of the mineral wealth of Missouri, which is yet in its infancy, but in which are included almost all the metals of commerce in inexhaustible supply, will serve as an additional source to insure great prosperity to this firmly established and prosperous trade centre.

AN experimental trial of the Westinghouse brake was made near Pittsburg lately. Thirty passenger and baggage-cars having the brake attached were made up in one train, two engines attached and the train hauled to East-Liberty. Upon the return trip, a stop was made in a length of seven hundred feet when the train was running at the rate of thirty miles an hour. The stop was made at Milvale, on a down grade of fifty-two feet to the mile. There can be no doubt that the brake will be applied to freight-cars ere long.

THE Camden and Amboy Railroad propose to transport bonded merchandise from New-York to Philadelphia and Western cities. It will be transported in small iron cars or boxes, in conformity with the rules of the Treasury Department, and under its lock and key. These small cars, not to exceed three feet in width, three in height, and five in length, may be conveyed inside of an ordinary box-car, but the merchandise in them must not be disturbed until it arrives at its final destination.

THE unprecedented rapidity with which our railroad system is being extended is well shown in some statistics from Iowa. In the last eight years, no less than two thousand miles have been constructed in that State, of which more than one thousand have been made in the years 1869 and 1870. The railroads of Iowa are 2683 miles long, and the gross earnings for the past nine years about $50,000,000.

MR. H. M. BRITTON, Master Mechanic of the Cincinnati, Indianapolis, and La Fayette Railway, has been appointed Superintendent of the White Water Valley Railway, a position which he is entirely well qualified to fill. Mr. Britton has a large experience in railway matters, both East and West, and his many friends will hear with pleasure his appointment to this responsible office.

WILLIAM B. COATES, of Philadelphia, has perfected and secured an invention, simple and reliable, for indicating, by an alarm, when a car-axle breaks, and supporting it with safety to the passengers. His device operates, by pressure of friction, an alarm, the instant the axle is broken, and also brings into action an apparatus which supports the broken parts.

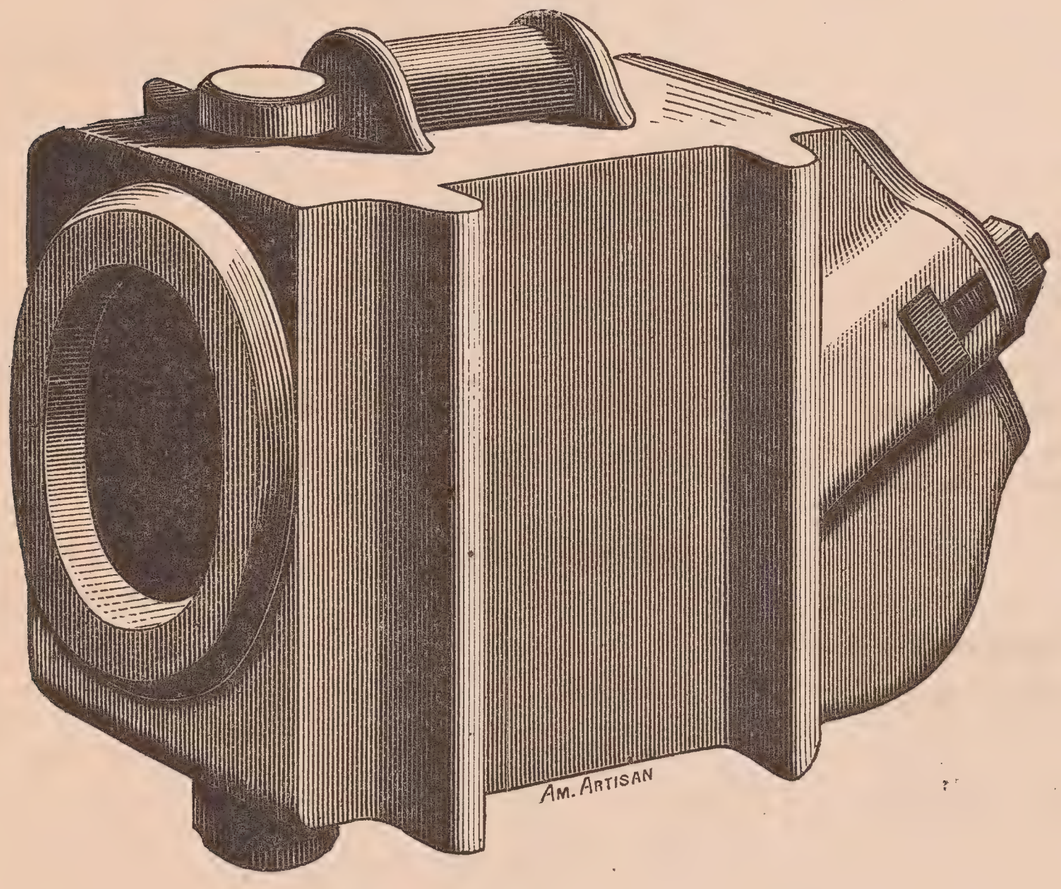
A NEW city railway has lately been opened in Brooklyn, N. Y., five miles in length, from Fulton Ferry to Greenwood. Each car carries fourteen passengers, and is constructed in the most approved manner. The driver acts as conductor, the fares being deposited in a patent cash-box; the car-door is opened and closed by the driver by means of cords.

Axle-Box for Railway Cars.

THE engravings illustrate BOYDEN'S IMPROVED AXLE-BOX, designed for the purpose of more effectually retaining the lubricant, and at the same time preventing the dust and dirt from getting in at the back part of the box. Every one familiar with the practical working of the plans and methods heretofore in use is aware how imperfectly they accomplished the ends above named. The opening in the back part of the box being necessarily so much larger than the axle, gives the lubricant a free passage to dash out at every surge of the car, at the same time allowing dust and dirt to enter and mix with the lubricant that is retained, cutting the bearing and causing hot-boxes. The improvement herewith illustrated is comparatively simple in construction and detail, and has been tested on several of our leading lines of road with the best results.

Fig. 1 represents a perspective view of the box; Fig. 2, a cross section; and Fig. 3, a vertical longitudinal section. A represents the box or casing of the apparatus, in which the lubricating material is placed. The cylindrical end portion of the axle is shown at B, the end passing into the case A, the circular hole shown in Fig. 1. The journal D is formed on the end of the axle, and made of a reduced diameter, and fitted into the under side of the bearing E, which is

Fig. 1.



secured in the upper part of the casing A, and constituting a portion of the axle-box, of which the case forms the other part. Fitted upon the axle B within the case A, and near the outer end of the journal D, are two semi-circular packing-plates F, which are placed one upon the upper and the other on the lower side of the axle D, and are each rebated at their two

Fig.2

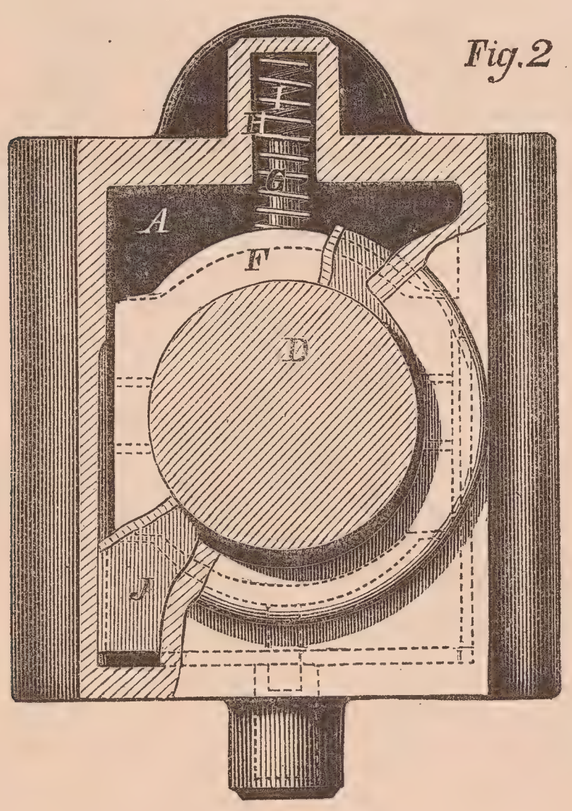
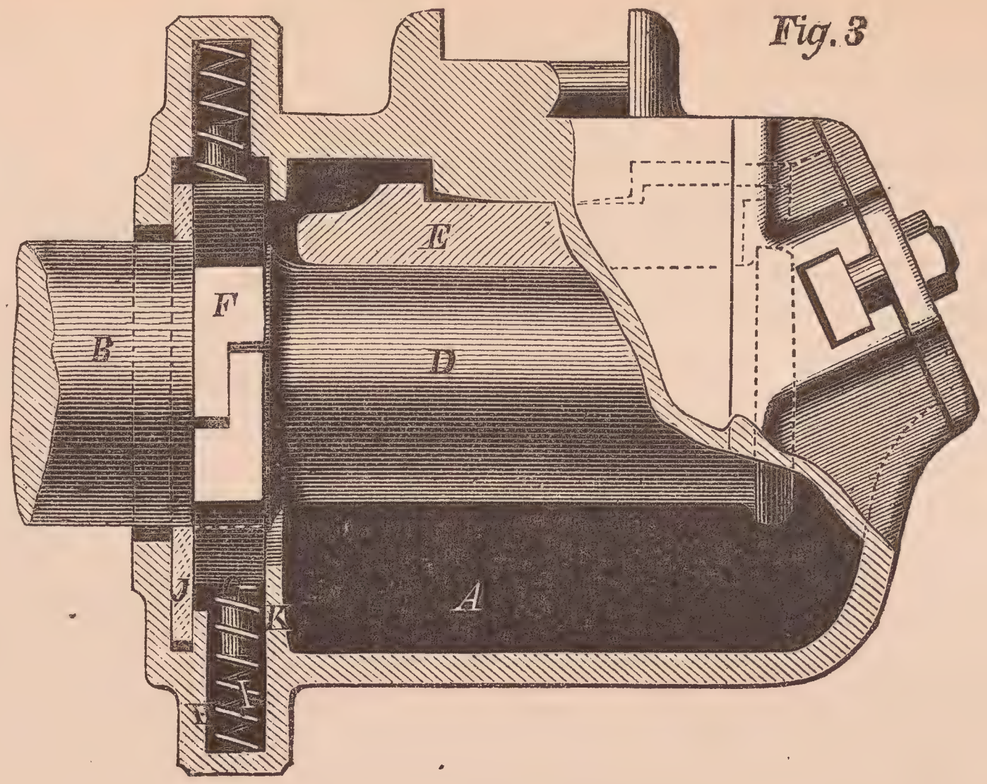


Fig. 3



ends, so that lips or tongues are formed, the lips upon one of the plates lapping past or upon those of the other in such a manner as to break the joints where the ends of the two plates are brought together, as shown more fully in Fig. 3. Each of the plates is provided with a vertical stem G, which projects into a cylindrical recess or socket H, provided in the adjacent side of the case A, the stems being surrounded by spiral springs I, which press the plates F inward, with their inner surfaces in snug contact with the cylindrical portion of the axle upon which the plates are situated. Placed around the axle, between the plates F and the contiguous end of the case A, is a washer J, which may be of leather or any suitable material; the plates F are kept in contact with the washer J by vertical partition plates K, formed transversely upon the top and bottom of the case.

The case A has, of course, a suitable quantity of lubricating material placed in it, which lubricates the journal D to the required degree, this material being prevented from escaping or working out from the case around the cylindrical portion of the axle by the packing-plates F, pressed closely on it by the springs I, and the leaking of the lubricant at the junction of the extremities of the plates being guarded against by the lapping past each other of the lips left upon the extremities by rebating them. The washer J, by forming a close packing between the plates and the contiguous end of the case A, prevents the outward passage of the lubricant that may find its way above or below the packing-plates, the lubricant being by these means effectually retained within the case, thereby securing its most efficient and economical action in lubricating the journal.

The packing-plates F should be made of hard brass. They should be spread apart $\frac{3}{8}$ of an inch, and bored out $\frac{1}{16}$ larger than the axle. The springs should be made of No. 11 brass wire, the length to be determined according to the depth of the box. The washer J should be made to fit the axle and the inside of the box neatly. This is all the fitting necessary for getting the boxes ready for use. The metallic packing-plates in the back end of the box effectually prevent any dirt or dust from entering, thereby keeping the lubricating material free from grit. A saving of over fifty per cent of oil, and an equal saving in wear of journals and bearings, guaranteed; and *danger and delay from hot-boxes effectually overcome,* by using this invention, which for simplicity and durability has no equal. Further information may be obtained by addressing the proprietors, Messrs Mann, Boyden & Co., Altoona, Pennsylvania.

India Rubber.

THE belt of land around the globe, five hundred miles north and five hundred miles south of the equator, abounds in trees producing the gum of India rubber. They can be tapped, it is stated, for twenty successive seasons without injury, and the trees stand so close that one man can gather the sap of eighty in a day, each tree yielding, on an average, three tablespoonfuls daily. Forty-three thousand of these trees have been counted in a tract of country thirty miles long by eight wide. There are in America and Europe more than one hundred and fifty manufactories of India rubber articles, employing some five hundred operatives each, and consuming more than ten million pounds of the gum per year, and the business is considered to be still in its infancy. But to whatever extent it may increase, there will still be plenty of rubber to supply the demand.

Miscellaneous Items.

To clean paint, provide a plate with some of the best whiting to be had; have ready some clean warm water and a piece of flannel, which dip into the water and squeeze nearly dry; then take as much whiting as will adhere to it, and apply it to the painted surface, when a little rubbing will instantly remove any dirt or grease. After which, wash the part well with clean water, rubbing it dry with a soft chamois. Paint thus cleaned looks as well as when first laid on, without any injury to the most delicate colors. It is far better than using soap, and does not require more than half the time and labor.

TREES are out of place when they overshadow the roof of a house, or darken its windows, or shut out a fine prospect. It is the testimony of eminent physicians that no small part of the sickness of families is attributable to the shading of dwellings by overhanging trees and thick clustering vines. Our bodies need light, pure sunlight, and a great deal of it, and our spirits need it none the less; and he who shuts out this genial dispenser of health makes a great mistake and does a great wrong.

FROM an English almanac we, a long time since, cut a recipe for mending china, and the opportunity having occurred for trying, we found it admirable; the fracture scarcely being visible after the article was repaired. It is thus made: Take a very thick solution gum arabic in water, and stir it into plaster of until the mixture becomes a viscous paste. with a brush to the fractured edges and stick together. In three days the article can not broken in the same place. The whiteness ment renders it doubly valuable.

NEW-JERSEY nail-mills are manufactur patent nail, for which they have secured a State right. It has serrated edge, and its superiority is said to be manifest in work where any jolting motion may have a tendency to shake the nail loose.

ANY hard steel tool, says the *Boston Journal of Chemistry,* will cut glass with great facility when kept freely wet with camphor dissolved in turpentine. The ragged edges of glass vessels may also be thus easily smoothed by a flat file.

IT frequently happens that painters splash plate or other glass windows when they are painting the sills. When this is the case, melt some soda in very hot

water and wash them with it, using a soft flannel. It will entirely remove paint.

MORRIS SELLERS, long Master Mechanic of the Des Moines Valley Railroad, has resigned that position to accept an appointment as General Agent of the Westinghouse Air Brake Company.

Facetiæ.

MIKE MURPHY was taken to task by his spiritual guide for having stolen the Widow Maloney's pig. He listened with downcast eyes and much meekness to a well-deserved lecture from the priest, upon the wickedness of the theft he had committed, till the reverend gentleman asked him what he would be able to say in the great judgment day, when he should be confronted by Mrs. Maloney and the stolen pig? when he brightened up and said, "And you say that the *pig* will be there, yer riverence?" "Yes, Mrs. Maloney and the pig, living witnesses to your wrong-doing. What, I repeat, can you say in such a presence?" "Yer riverence, I'll say, 'Widdie Maloney, *there's yer pig!*'"

OWED TO LAKE ONTARY.

"GREEN ar' thy waters, green as bottle-glass—
Behold 'em strecht thar!
Fine muskalonges and Oswego bass
Is oft'n katched thar.
Thar the red Injin once took his delights,
Fisht, fit and bled;
Now most of the inhabitants is whites,
And nary red!"

THE other day, a tobacconist at Cleveland hung in front of his shop the following notice, written on a board: "Wanted—A girl to strip." A special meeting of the women's rights society was immediately called to investigate the case.

A CHICAGO hair restorer agent went out into the suburbs, stuck his posters all over a church pulpit, and then asked the minister to call attention to them.

PEOPLE should never interpret maxims too literally. To "speed the parting guest," it is not necessary to kick him down-stairs.

WHY is the earth like a blackboard? Because the children of men multiply upon the face of it.

Car-Wheel Manufacturers.

Atlantic Iron-Works	Portsmouth, Va.
Barnum & Richardson Manufacturing Co.	Chicago, Ill.
Barney & Smith Manufacturing Co.	Dayton, Ohio.
Bass & Hanna	Fort Wayne, Ind.
Davenport, Fairbairn & Co	Erie, Pa.
awson Manufacturing Co	Dawson, Ga.
troit Car-Wheel Works	Detroit, Mich.
& Bidwell	Allegheny City, Pa.
isburg Car Manufacturing Co.	Harrisburg, Pa.
n & Woodin	Berwick, Pa.
Gill	Columbus, Ohio.
ar-Wheel Works	Wilmington, Del.
ar and Foundry Co	St. Louis, Mo.
tic Car-Wheel Co	Jersey City, N. J.
ar and Wheel Works	Cincinnati, Ohio.
ls Car Co	Jeffersonville, Ia.
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& N. C.	Buffalo, N. Y.
Works	High Bridge, N. J.
ouglas	Bordentown, N. J.
pany	Richmond, Va.
nts & Co	Jersey City, N. J.
Sons	Philadelphia, Pa.
Woodbury & Company	E. Cambr'ge, Mass.
Wyoming Valley Manufacturing Co	Wilkesbarre, Pa.

Locomotive Builders.

Baldwin Locomotive Works	Philadelphia, Pa.
Brooks Locomotive Works	Dunkirk, N. Y.
Danforth & Cooke	Paterson, N. J.
Dickson Manufacturing Co	Scranton, Pa.
Grant Locomotive Works	Paterson, N. J.
Hinckley & Williams	Boston, Mass.
Manchester Locomotive Works	Manchester, N. H.
Mason, William	Taunton, Mass.
McKay Iron and Locomotive Works	Jersey City, N. J.
Portland Company	Portland, Me.
Pittsburg Locomotive Works	Pittsburg, Pa.
Rogers Locomotive Works	Paterson, N. J.
Rhode Island Locomotive Works	Providence, R. I.
Schenectady Locomotive Works	Schenectady, N. Y.
Porter, Bell & Co., (light locomotives,)	Pittsburg, Pa.
Taunton Locomotive Works	Taunton, Mass.

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Reliable and Cheap Car Springs

FOR FREIGHT CARS.

Cars equipped complete with our unequaled

RUBBER CENTER SPIRAL GROUP SPRINGS.

1 inch motion,.....$25 per car.
1¼ " " ..... 30 "
1½ " " ..... 35 "

AND WITH OUR

DINSMORE NEST SPIRAL SPRINGS,

which have been tested on almost every road in the country.

1½ inch motion, 8 to a car,.....$27.
1¾ " " 8 " ..... 32.
2 " " 8 " ..... 35.

A set of either of these Springs is amply sufficient to sustain a weight of twelve tons, and are warranted to be superior to any other in the market at the same price.

Springs of greater capacity and motion supplied at correspondingly low prices.

Volute, Rubber, Single Spiral, Compound Spiral, and ***Belleville Springs*** furnished at short notice.

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Car Seats, Mattresses, and Pillows.

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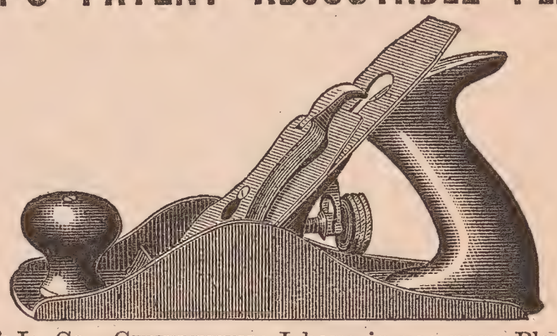

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Sold by all Hardware dealers. Send for Descriptive Catalogue, embracing a full assortment of both the Iron and Wood Planes.

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Roofs, Turn-Tables, and Transfer-Tables,

EITHER OF IRON OR WOOD.

Railroad Passenger and Freight Cars, Street Railroad Cars.

☞ Post's Patent Iron and Combination Bridges; Howe Truss Bridges, with Patent Iron Clamps; Street Railroad Cars, with Higley's Patent Running Gear and Brake.

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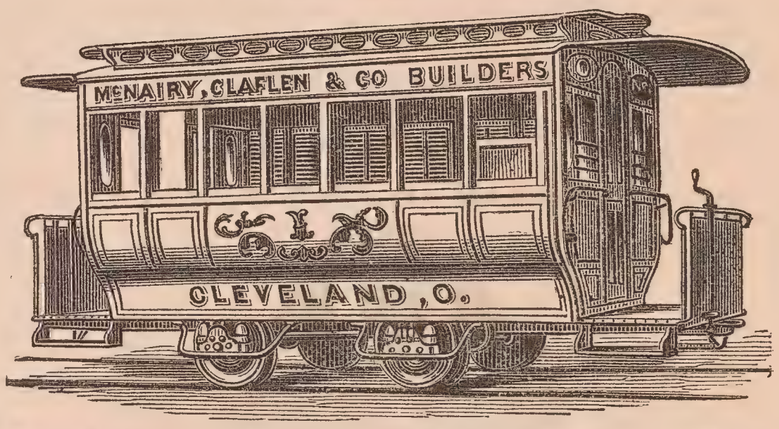

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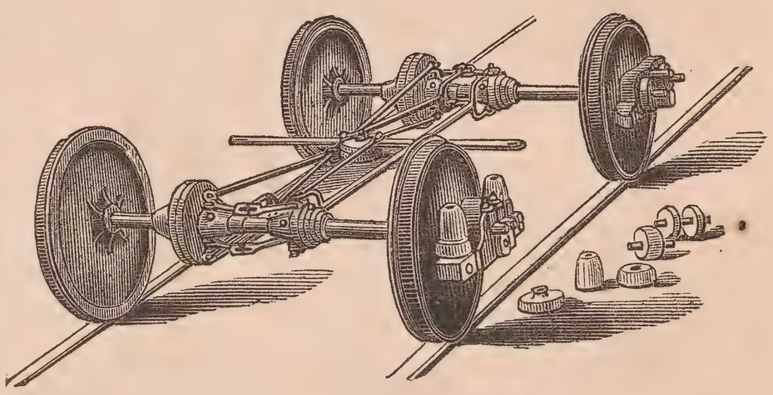

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Erie Railway	*E. O. Hill		Susquehanna, N. Y.
Erie Railway	James B. Gregg		
Erie Railway	H. L. Brown	C. A. Smith	Jersey City, N. J.
Erie Railway	M. E. Brown	M. Wilder	Buffalo, N. Y.
Erie Railway	W. E. Cooper	W. E. Cooper	Hornellsville, N. Y.
Erie Railway		W. E. Rutter	Elmira, N. Y
Evansville & Crawfordsville	John L. White	A. Sharra (fore'n)	Evansville, Ind.
Evansville, Henderson & Nashville	W. H. McCafferty	W. H. McCafferty	Nashville. Tenn.
European & North Am. (of Maine)	A. O. Bailey	J. H. Brown	Oldtown, Maine.
Erie & Pittsburg	John Young	John Young	Erie, Pa.
Eldora			Dubuque, Iowa.
F			
Florida	A. W. Taylor	G. Hernandez	Fernandina, Fla
Flint & Pere Marquette	Sanford Keeler	Sanford Keeler	East-Saginaw, Mich.
Fitchburg	Geo. A. Cooledge	Enos Varney	Charlestown, Mass.
Fitchburg & Worcester		Samuel Stevens	Fitchburg, Mass.
G			
Grand Trunk	*Richard Eaton	J. W. W. McWood	Montreal, Canada.
Galveston, Houston & Henderson	William McBeth	E. J. Sherman	Galveston, Texas.
Grand River Valley		James Potts	Jackson, Michigan.
Grand Rapids & Indiana			Fort Wayne. Ind.
Great Western of Canada	*Wm. A. Robinson		Hamilton, Canada.
Georgia	William Hardman	T. M. Preval	Augusta, Ga.
Greenville & Columbia	J. T. Price	J. T. Price	Helena, S. C.
H			
Hanover Branch	John J. Bingley	Henry Britcher	Hanover, Pa.
Hartford & New-Haven	N. Slingland	F. Leppense	Hartford, Ct.
Hannibal & St. Joseph	H. A. Towne	H. C. Whiting	Hannibal, Mo.
Hartford, Providence & Fishkill	Edwin Garfield	V. D. Perry	Hartford, Ct.
Hackensack & New-York	Abra'm Angausen		Hackensack, N. J.
Hastings & Dakota	C. C. Clements		Hastings, Minn.
Housatonic	C. R. Morris	J Ferris	Bridgeport, Ct.
Houston & Texas Central	Reuben B. Snyder	J. F. Rice	Houston, Texas.
Houston Tap & Brazoria	A. Malsch	R. H. Yeomans	Houston, Texas.
Huntington & Broad-Top Mountain	D. G Gilchrist	M. Tellerhoof	Saxton, Pa.
Hempfield	T. Marsh		Wheeling, Va.
Hudson River	Wm. Buchanan	John McKenna	New-York
Hudson River	John Dykeman	Charles D. Mills	East-Albany, N. Y.
I			
Indianapolis, Cincinnati & Lafayette	H. M. Britton	H. M. Britton	Cincinnati, Ohio.
Indianapolis, Peru & Chicago	John McKenna	John McKenna	Peru, Ind.
Illinois Central	S. Hayes	C. Scoville	Chicago, Ill,
Iowa & Missouri State Line			Farmington, Iowa.
Iron	Perry Scott	Clem. Roetling	Ironton, Ohio.
Indianapolis & St Louis	C. E. Benton	C. E. Benton	Mattoon, Ill.
Indianapolis, Bloomington & Western		S. S. Smith	Urbana, Ill.
Ionia & Lansing	H. Loughlin		Lansing, Mich.
J			
Jeffersonville, Madison & Indiana	Reuben Wells	John Higgins	Jeffersonville, Ind.
Jackson, Lansing & Saginaw	Andrew Wilson	A. Wilson	Jackson, Michigan.
K			
Keokuk & St. Paul	P. R. Sutton	Wm. McElroy	Keokuk, Iowa.
Knox & Lincoln			Bath, Maine.
Kentucky Central	J. R. Ledyard	J. L. Hackenthorn	Covington, Ky.
Knoxville & Charleston			Knoxville, Tenn.
Kansas Pacific	Geo. W. Cushing	Geo. W. Cushing	Wyandotte, Kansas.
Kalamazoo, Allagan & Grand Rapids			Kalamazoo, Mich.
Kansas City, St. Joseph & Council Bluff	H. L. Cooper		St. Joseph, Mo.
L			
Lake Erie & Louisville	John Pero		Fremont, Ohio.
Lackawanna & Bloomsburg	Chas. Graham		Kingston, Pa.
Lehigh Valley	J. Kinsey		South-Easton, Pa.
Lehigh Valley	P. Hofecker	E. R. Brown	Weatherly, Pa.
Lehigh Valley	A. Mitchell	Mauch Chunk, Pa.	Delano, Pa.
Lehigh Valley	D. Clark		Hazelton, Pa.
Lehigh & Susquehanna	L. C. Brastow	L. C. Brastow	Wilkesbarre, Pa.
Lehigh & Susquehanna	Wm. H. Brown		Mauch Chunk, Pa.
Leavenworth, Lawrence & Gal	S. Philbrick		Lawrence, Kansas.
Lewy's Island	C. W. Button	Damase Merceir	Milltown, Maine.
Little Rock & Fort Smith			Little Rock, Ark.
Lebanon Springs			Burlington, Vt.
Little Miami, Col. & Xenia	J. H. Setchel	M. P. Ford	Cincinnati, Ohio.
London & Port Stanley			London, C. W.
Louisville, New-Albany & Chicago	Jacob Losey	Jacob Losey	New-Albany, Ind.
Long Island	Chs. A. Thompson	B. T. Little	Hunter's Point, L.I.
Louisville, Cincinnati & Lexington	John Skidmore	Theo. G. Shaw	Louisville, Ky.
Louisville & Nashville	Thatcher Perkins	Thatcher Perkins	Louisville, Ky.
Lake Shore & Michigan Southern	†James Sedgley		Cleveland, Ohio
Michigan Southern Division	James K. Taylor	John Kirby	Adrian, Mich.
Buffalo Division	B. H. Kidder.		Buffolo, N. Y.
M			
Macon & Augusta			Macon, Ga.
Maine Central	J. W. Philbrick	J. W. Philbrick	Waterville, Me.
Macon & Western	B. Pope Freeman	James A. Knight	Macon, Ga
Manchester & Lawrence	Edward Studley	M. W. Dickerman	Concord, N. H.
Macon & Brunswick	M. Thornton	M. Thornton	Macon, Ga.
Maysville & Lexington			Maysviille, Ky.
Marietta & Cincinnati	E. Bosley	E. Bosley	Chillicothe, Ohio.
Memphis, Clarksville & Louisville			Clarksville, Tenn.
Memphis & Little Rock	D. R. Wing		Little Rock, Ark.
Memphis & Charleston	Michael Burk	A. W. Drew	Memphis, Tenn.
Memphis & Charleston	L. M. Sellars	Thomas Varun	Huntsville, Ala.
Mineral Point	Robert Hay		Mineral Point, Wis.
Mississippi & Tennessee	Henry Teague	Henry Teague	Memphis, Tenn.
Mississippi Central	Henry Gibbon	John E. Becton	Water Valley, Miss.
Maryland & Delaware	Samuel Peters		Greensboro, Md.
Mississippi, Gains. & Tus			Gainsville, Ala.
Midland Pacific			Nebraska City, Neb.
Milwaukee & St. Paul	T. S. Davis	Wm. E. Kettridge	Milwaukee, Wis.
Milwaukee & St. Paul		John Baillie	Milwaukee, Wis.
Minnesota, Iowa & Dakota Division	James Waters	D. F. Wilson	Minneapolis, Minn.
Michigan Central	A. S. Sweet, Jr	J. B. Sutherland	Detroit, Mich.
Montgomery & West-Point	J. McVey	W. H. Daniels	Montgomery, Ala.
Montgomery & Eufaula	James McCann	I. E. Holmes	Montgomery, Ala.
Mobile & Montgomery	James McFarland	L. Barham	Montgomery, Ala.
Mobile & Girard	William Eyles	A. J. Nix	Girard, Ala.
Mobile & Ohio	L. J. Fleming	John McHugh	Mobile, Ala.
Missouri River, Fort Scott & Gulf	John S. McCrum		Kansas City, Mo.
Missouri, Kansas & Texas			
N			
Nashville & Chattanooga	John U. Eastman	J. G. Sawyer	Nashville, Tenn.
Nashville & Decatur	C. B. Knowles	C. B. Knowles	Nashville, Tenn.
New-Bedford & Taunton	Robert Chase	Robert Chase	New-Bedford, Mass.
New-Canaan			New-Canaan, Ct.
New-Brunswick & Canada	T. Armstrong	T. Armstrong	Saint Andrew's, N. B.
New Haven & Northampton	Henry Fox	Henry Fox	Westfield, Mass.
New-York & Oswego Midland	Wm. H. Griggs		Oneida, N. Y.
New-York & Harlem	Wm. M. Strong	Leander Garey	New-York.
New-York Central	* C. T. Ham	Joseph Jones	Albany, N. Y.
New-York Central	G. B. Van Vorst		Albany, N. Y.
New-York Central	Henry Watkeys		Syracuse, N. Y.

* General Master Mechanic. † Mechanical Engineer.

* Mechanical Superintendent. † General Master Mechanic.
‡ General Master Mechanic and Master Car-Builder.

Railroad.	*Master Mechanic.*	*Master Car-Builder.*	*Residence.*
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New-York Central		Wm. Johnson	Buffalo.
New-York & Flushing			Flushing, L. I.
New-York, Providence & Boston	Jas. H. Anderson	Jas. H. Anderson	Providence, R. I.
New-York & New-Haven	H. Kittendorf	M. C. Andrews	New-Haven, Ct.
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New-Jersey & Transportation Co	John Headden	David H. Baker	Jersey City, N. J.
New-Haven & Derby			New-Haven, Ct.
New-Orleans, Opelousas & Gt. Western	John McCluskey	Matthew Nolan	Algiers, La.
New-Lisbon			Leetonia, Ohio.
New-Orleans & Ohio	John R. Jordan	John R. Jordan	Paducah, Ky.
New-Orleans, Jackson & Gt. Northern	John Conlon	Charles Bartine	New-Orleans, La.
New-Haven, Hartford & Springfield			Hartford, Ct.
Naugatuck		George W. Gray	Bridgeport, Ct.
Newark & Bloomfield	Luke F. Tronson		Hoboken, N. J.
Nova Scotia	W. Johnson		Bedford, N. S.
North-Missouri	John Calhoun	C. S. Buck	St. Louis, Mo.
North-Carolina	E. Wade	B. G. Sergeant	Co. Shops, N. C.
New-Orleans, Mobile & Chattanooga	Josiah Bettis	George Shattuck	Mobile, Ala.
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Northern Central		G. W. Demarest	York, Pa.
North-Lebanon		Henry B. Oves	Lebanon, Pa.
North-Pennsylvania	Franklin Roop	Franklin Roop	Philadelphia, Pa.
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Northern	James W. Lander	Albert Langmaid	Concord, N. H.
Northern of New-Jersey	T. W. Demarest		New-York.
Norwich & Worcester	Richard Colburn	G. R. Bentley	Norwich, Ct.
Northern of Canada	James W. Forster		Toronto, Can.
Norfolk & Petersburg	J. S. Whitworth	J. S. Whitworth	Norfolk, Va.

O

Ogdensburg & Lake Champlain	William A. Short		Malone, N. Y.
Oswego & Syracuse	Josiah Bettis	J. H. Parker	Oswego, N. Y.
Ohio & Mississippi	George W. Harris	M. M. Martin	Cochran Shops, Ind.
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Oil City & Pithole	George Thompson		Pithole, Pa.
Oil Creek & Alleghany River	J. S. McElroy	Jacob Williams	Corry, Pa.
Oil Creek & Alleghany	H.J.Bookhammer	John Monks	Oil City, Pa.

P

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Pacific of Missouri	Jacob Johann	Jacob Johann	St Louis, Mo.
Paterson & Newark			Paterson, N. J.
Pennsylvania	* Isaac Dripps		Altoona, Pa.
Pennsylvania	H. D. Garrett	I. W. Van Houten	W. Philadelphia, Pa.
Pennsylvania	M. A. Shattuck	Samuel W. Myers	Harrisburg, Pa.
Pennsylvania	T. W. Worsdell	John P. Levan	Altoona, Pa.
Pennsylvania	D. O. Shaver	R. S. Ramsey	Pittsburg, Pa.
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	W. L. Foster	Robt. M. Messimer	Renovo, Pa.
	W. L. Holman	Wm. P. Newcomb	Kane, Pa.
	W. T. Smith	John Quigley	Erie, Pa.
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Philadelphia & Reading	John Wootten	Aaron Steinbach	Reading, Pa.
Philadelphia, Germ'n & Norris'n	John Moyer	Nathan Pawling	Philadelphia, Pa.
Philadelphia & Baltimore Central	S. D. Danfield	SamuelD.Danfield	Chester, Pa.
Pittsburg, Cincinnati & St. Louis	James Ball	James Ball	Logansport, Ind.
	Robert Curtis	Theo. Chamberlain	Columbus, Ohio.
	Thomas Denmead		Dennison, Ohio.
	Thomas V. Losee	John Gottschall	Indianapolis, Ind.
		James McGee	Steubenville, Ohio.
Pittsburg, Fort Wayne & Chicago	S. M. Cummings	John Marquis	Alleghany, Pa.
Pittsburg, Fort Wayne & Chicago	J. M. Boon	Wm. Waddington	Fort Wayne, Ind.
Pittsburg & Connellsville	D. P. Rennie	J. M. Rutter	Connellsville, Pa.
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Peninsular			Battle Creek, Mich.
Portland & Rochester	Jas. S. Drake	Samuel Dean	Portland, Me.
Portland & Kennebec	John Ellis	J. W. Trussel	Augusta, Me.
Portland & Oxford Central	Geo. W. Battles	Geo. W. Battles	Buckfield, Me.
Portland, Saco & Portsmouth	John Donnell		Portland, Me.
Port Royal			Beaufort, S. C.
Port Hope, Lindsay & Beaverton	H. G. Taylor	H. G. Taylor	Port Hope, Can.
Port Huron & Lake Michigan			Port Huron, Mich.
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Portsmouth, Gt. Falls & Monmouth	James Tucker	E. Fall	Union Village, N.H.
Petersburg	R. B. Adams	Alex. Wright	Petersburg, Va.
Providence & Worcester	Joseph Kelly	Olney L. Smith	Providence, R. I.
Peninsular R. R	T. G. Templeton		Battle Creek, Mich.

R

Raritan & Delaware Bay	Rufus Blodgett	Rufus Blodgett	Manchester, N. J.
Raleigh & Gaston	J. B. Gayle	J. B. Gayle	Raleigh, N. C.
Rensselaer & Saratoga	W. B. Gage		Troy, N. Y.
Richmond, Fredericksburg & Potomac	H. Kuhn	W. H. Trainham	Richmond, Va.
Richmond & Danville	John McFarland	B. P. Owen	Richmond, Va.
Richmond & Petersburg	Wm. Piermont	J. J. Martin	Richmond, Va.
Richmond & York River			Richmond, Va.
Rome, Watertown & Ogdensburg	Wm. Jackson	Wm. Jackson	Rome, N. Y.
Reading & Columbia	B. Van Lew		Columbia, Pa.
Rome, Georgia	O. W. Harbin	O. W. Harbin	Rome, Ga.
Rochester & Genesee Valley	M. E. Brown	M. Wilder	Buffalo, N. Y.
Rockford, Rock Island & St. Louis	R. D. Grant		Beardstown, Ill.
Rock Island & Peoria			Rock Island, Ill.
Rutland	N. L. Davis	M. M. Crooker	Rutland, Vt.

S

San Francisco & San José	R. B. Bishop	Frank Bellisle	San Francisco, Cal.
St. Croix & Lake Superior			New-York City.
St. Lawrence & Ottawa	Calvin Dame	Calvin Dame	Prescott, Canada.
St. Paul & Pacific	C. N. Parker, Jr	C. B. Boynton	St. Paul, Minn.
St. Louis & Iron Mountain	O. A. Haines	Oscar Doolittle	Carondelet, Mo.
Sandusky, Mans. & Newark		Charles Scoeby	Sandusky, Ohio.
St. Joseph Valley			Kalamazoo, Mich.
San Antonio & Mexican Gulf	W. T. Bingham		Victoria, Texas.
South Side of Long Island			New-York.
St. Paul & Sioux City	Jas. G. Butterfield		Shakopee, Minn.
St. Louis, Vandalia & Terre Haute	A. J. Sandborn		Effingham, Ill.
South-Carolina	W. B. Smith	John Reed	Charleston, S. C.
South-Side of Virginia	J. T. Robinett	J. T. Robinett	Petersburg, Va.
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Southern Minnesota	Wm. Lininger	W. H. Dunham	Hokah, Minn.
South-Pacific	John Hewitt		Pacific, Mo.
South-Western of Georgia	C. D. Wall.	F. H. Alley	Macon, Ga.
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Shore Line		C. F. Platt	New-Haven, Ct.
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Selma & Meridian	John Davis	G. K. Ashley	Selma, Ala.
Seaboard & Roanoke	J. B. Pendleton	J. B. Pendleton	Portsmouth, Va.
Stonington & Providence	J. H. Anderson	J. H. Anderson	Providence, R. I.
Selma, Rome & Dalton	Geo. S. Howden	W. W. Peirce	Selma, Ala.
Sioux City & Pacific		J. R. Dow	Missouri Val., Iowa.
Spartanburg & Union	J. N. Benner	Jacob Rice	Union C. H., S. C.
Sheboygan & Fond du Lac	J. H. Erwin	J. H. Erwin	Sheboygan, Wis.
Sullivan & Erie			Tonawanda, Pa.
Syracuse & Binghamton, N. Y.	B. G. Merrill	B. G. Merrill	Syracuse, N. Y.
Sycamore & Cortland			Sycamore, Ill.

* Superintendent of Motive Power and Machinery.

Railroad.	*Master Mechanic.*	*Master Car-Builder.*	*Residence.*
T			
Taunton Branch			Taunton, Mass.
Tioga	Peres Bonny	D. H. Stratton	Blossburg, Pa
Texas & New-Orleans	R. B. Baer		Houston, Texas.
Tennessee & Pacific	William McKeand	William McKeand	Nashville, Tenn.
Terre Haute & Indianapolis	C. R. Peddle	H. Kirmse	Terre Haute, Ind.
Toledo, Wabash & Western	W. F. Ray		Fort Wayne, Ind.
Toledo, Wabash & Western	T. G. Gorman	David Hoit	Toledo, Ohio.
Toledo, Peoria & Warsaw	A. H. De Clerq	R. M. Hemphill	Peoria, Ill.
Troy & Bennington			Troy, N. Y.
Troy & Boston	Foster Church	R. V. Coon	Troy, N. Y.
U			
Union Pacific	I. H. Congdon	Geo. E. Stevens	Omaha, Nebraska.
Utica & Black River	John Bailey.	David James	Utica, N. Y.
Utica, Chenango & Susquehanna	C. H. Brown		Utica, N. Y.
V			
Virginia & Tennessee	F. Herk	I. A. Caldwell.	Lynchburg, Va.
Vicksburg & Meridian	Jas. B. Brown		Vicksburg, Miss.
Vineland			Vineland, N. J.
Vermont Central	J. M. Foss	Milton Sessions	St. Albans, Vt.
Vermont & Massachusetts	W. F. Kenney	Jacob Marsh	Fitchburg, Mass.
Vermont Valley			Rutland, Vt.
W			
Washington, Alex. & Georgetown			Washington, D. C.
Warwick Valley			Warwick, N. Y.
Wicomico & Pocomoke			Berlin, Md.
Wilmington & Manchester	George Hall	William Kinyon	Wilmington, N. C.
Wilmington, Charlotte & Rutherford	W. A. Gill	Thomas Myers	Laurenburg, N. C.
Wilmington, Columbia & Augusta			
Winchester & Potomac			Winchester, Va.
Westchester & Philadelphia	P. C. Clark	P. C. Clark	Philadelphia, Pa.
Wilmington & Weldon	John F. Devine	John F. Devine	Wilmington, N. C.
West-Jersey	W. McAllister	C. C. Williams	Camden, N. J.
Western Maryland	R. V. Dohoney	J. H. Nussear	Union Bridge, Md.
Winona & St. Peter	F. C. Ford	H. L. Preston	Winona, Minn
Western North-Carolina	E. H. Marsh	E. H. Marsh	Salisbury, N. C.
Western R. R. N. C	M. W. Atkinson	M. W. Atkinson	Fayetteville, N. C.
West-Feliciana	R. C. Brower		Woodville, Miss.
Whitehall & Plattsburg			Plattsburg, N Y.
Western & Atlantic	James Mullin	John Sherman	Atlanta, Ga.
Worcester & Nashua	George H Griggs	George H. Griggs	Worcester, Mass.
Welland	William Wells	William Pay	St. Catharine, C. W.

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Altoona Manufacturing Co	Altoona, Pa.
Adrian Car Co	Adrian, Mich,
Barney & Smith Manufacturing Co	Dayton, Ohio.
Baker, Jackson & Co	Latrobe, Pa.
Billmeyer & Smalls	York, Pa.
Bradley, Osgood	Worcester, Mass.
Brill & Son	Philadelphia, Pa.
Bitner, George W	Pittsburg, Pa.
Cambridge City Car Co	Cambridge City, Ind.
Canada Steam-Engine Co	Kingston.
Clendenning, W. W	Montreal.
Cummings, W. H	Jersey City, N. J.
Connellsville Machine and Car Co	Connellsville, Pa.
Detroit Car and Manufacturing Co	Detroit, Mich.
Dawson Manufacturing Co	Dawson, Ga.
Dickey, Neill & Co	Toronto.
Dickson Manufacturing Co	Scranton, Pa.
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Elmira Car-Works	Elmira, N. Y.
Fredericks & Co	Catasauqua, Pa.
Gardner, F. & Co.	Carlisle, Pa.
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Gilbert, Bush & Co	Troy, N. Y.
Goold, James & Co	Albany, N. Y.
Goodrich Car Co	Augusta, Ga.
Grice & Long	Trenton, N. J.
Haskell & Barker	Michigan City, Ind
Harrisburg Car Manufacturing Co	Harrisburg, Pa.
Heathcote, Herbst & Co	Glen Rock, Pa.
Hamilton, William & Son	Toronto.
Harlan, Hollingsworth & Co	Wilmington, Del.
Jackson & Sharp	Wilmington, Del.
Jackson & Woodin	Berwick, Pa.
Jones, J. M. & Co	West-Troy, N. Y.
Lombard, Thomas	Augusta, Me.
Lebanon Manufacturing Co	Lebanon, Pa.
Michigan Car Co	Detroit, Mich.
McNairy, Claflen & Co	Cleveland, Ohio.
Murray, Dougall & Co	Milton, Pa.
McVey, Walker & Co	Braddock's Field, Pa.
Meeker & Hedden	Newark, N. J.
Mowry Car and Wheel Works	Cincinnati, O.
Middletown Car & Manufacturing Co	Middletown, Pa.
Missouri Car and Foundry Co	St. Louis, Mo.
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Peabody & McDonald	Calais, Me.
Peters, Simon	Quebec.
Pittsburg and McKeesport Car Co	McKeesport, Pa
Pittsburg Car and Locomotive Co	Pittsburg, Pa.
Portland Co	Portland, Me.
Pullman Car Co	Chicago.
Quealy, W. J	Hannibal, Mo.
Ranlet Car Manufacturing Co	Laconia, N. H.
Russell & Co	Massillon, Ohio.
Sands, William L	Pottstown, Pa.
Schall, Michael	York, Pa.
Shaaber, W	Reading, Pa.
Stephenson, John. & Co	New-York, N. Y.
Stem, George H. & Co	Stemton, Pa.
Southern Car-Works	Independence, La.
Taunton Car Co	Taunton, Mass.
Tredegar Co	Richmond, Va.
Vigo Foundry and Terre Haute Car Works	Terre Haute, Ind.
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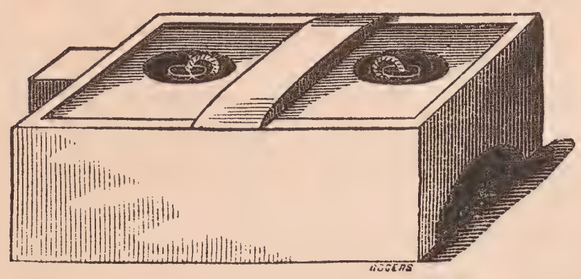

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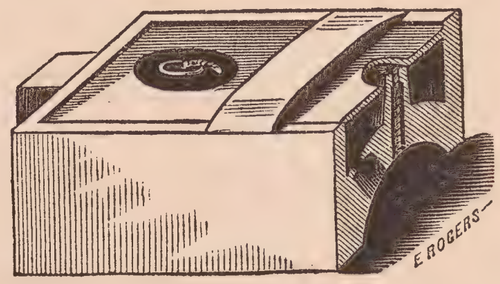

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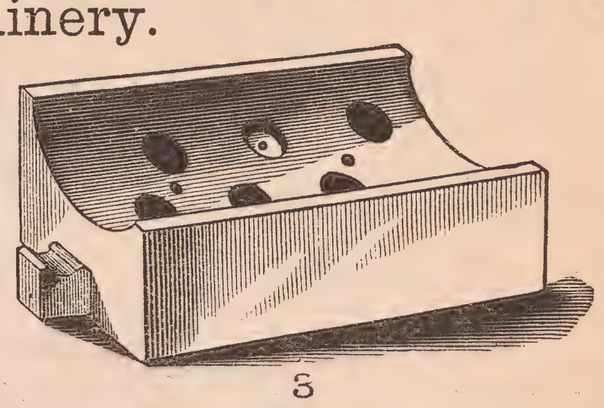

3

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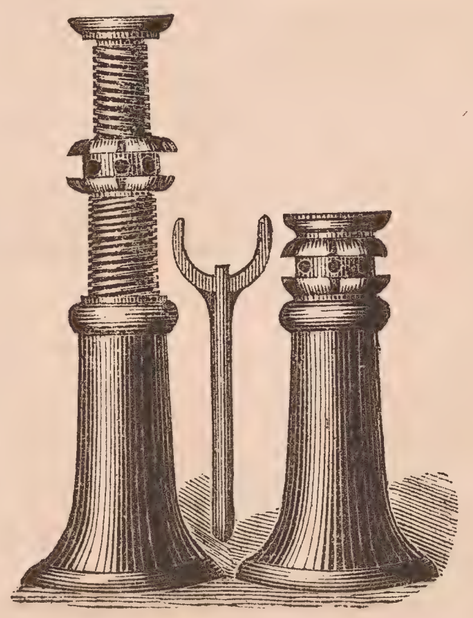

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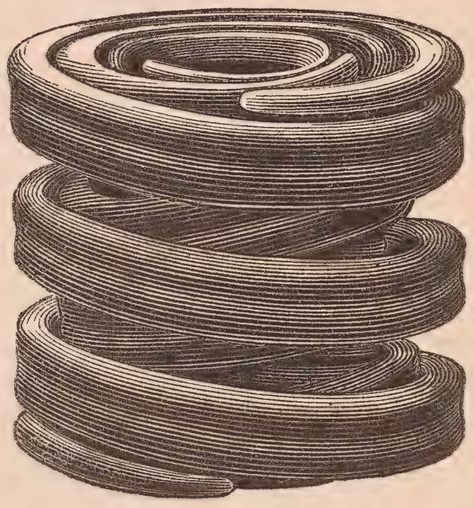

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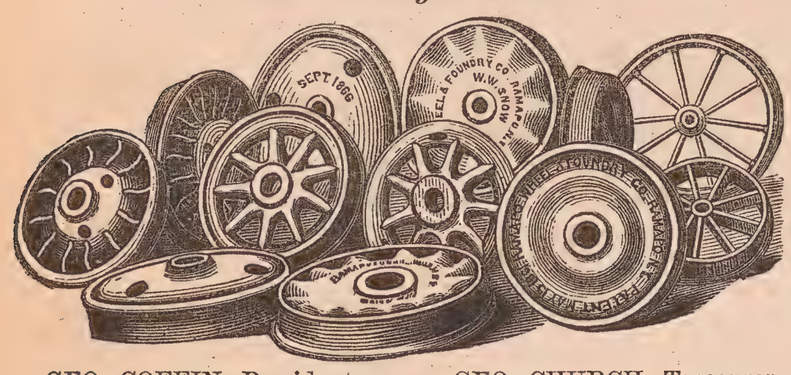

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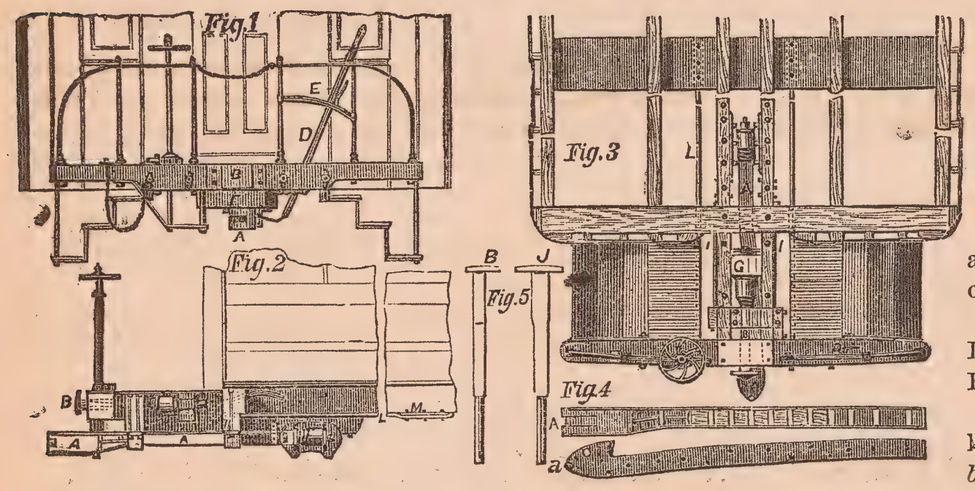

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DESCRIPTION.

Figure 1 is an elevation; Figure 2, a longitudinal section; Figure 3, a plan of an end of a car to which the arrangement has been applied; and Figures 4 and 5 show top and side views of the "Hook" and "Buffer," drawn on a larger scale than that of Figures 1, 2, and 3.

The letters refer to the same parts in all the figures. A is the coupling "Hook," B the "Buffer," C the "Stop," D the "Lever," E the "Quadrant Ratchet," F the "Truss Beam," G the "Spring Beam," H the "Suspender Beam," I the "Upward Trusses," K the "Main Spring," L the "Downward Trusses," and M the "Bolster."

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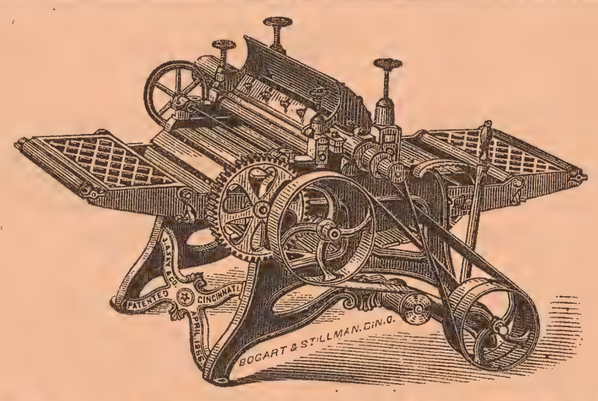

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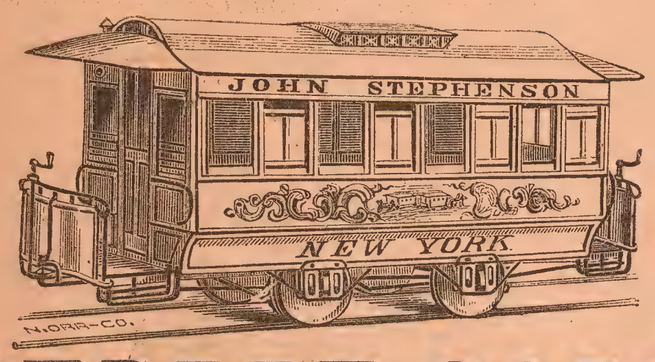

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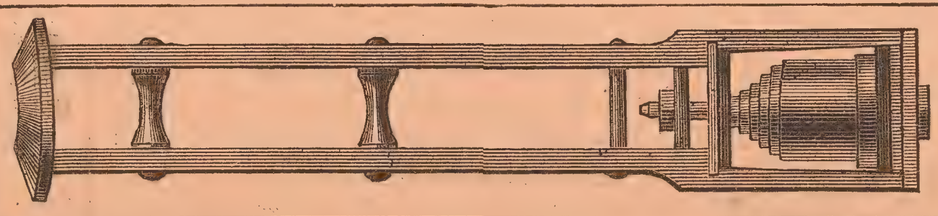

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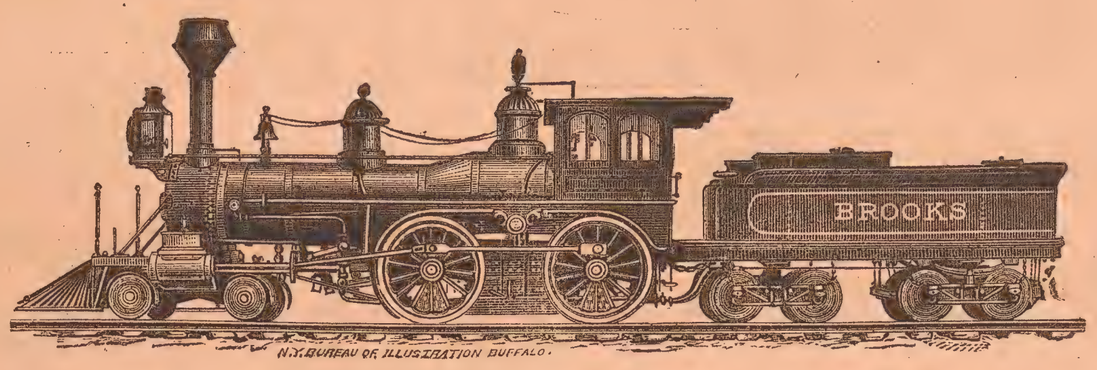

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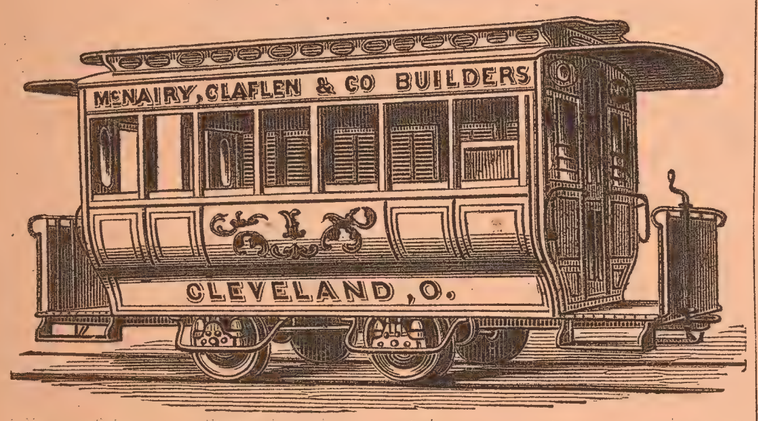

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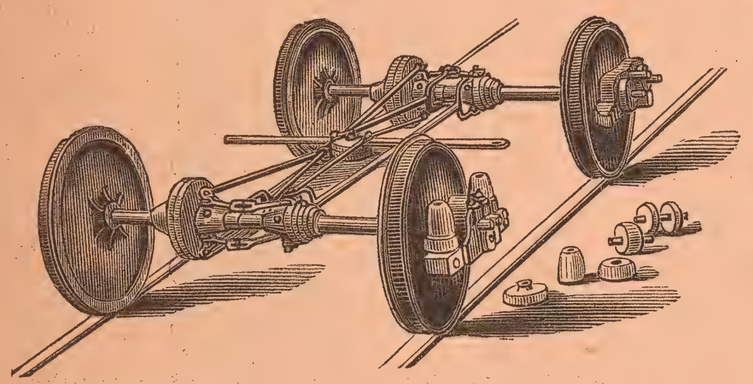

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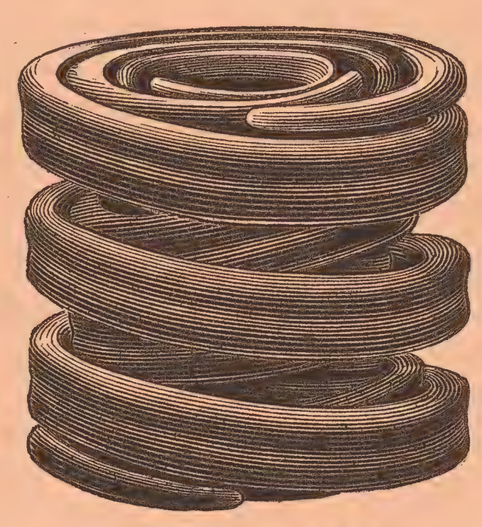

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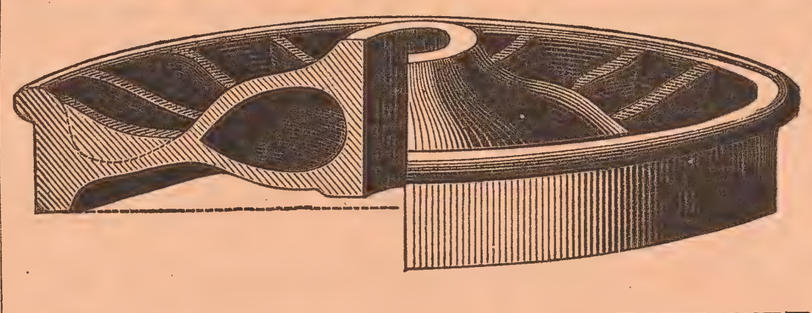

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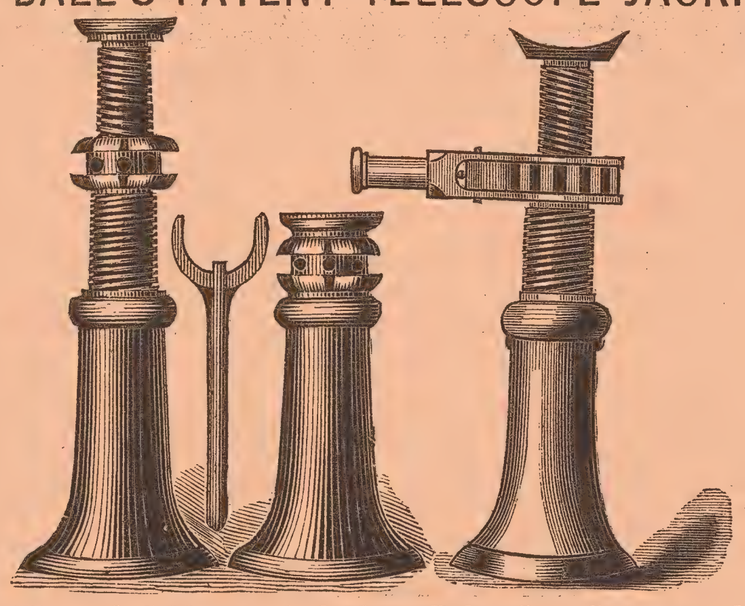

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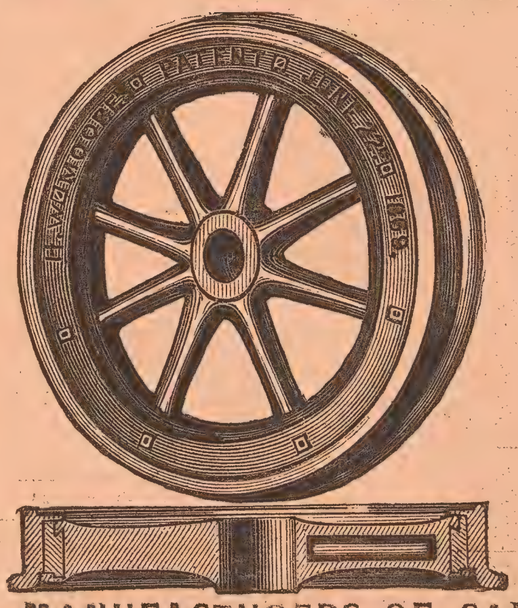

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THE NATIONAL CAR BUILDER.

DEVOTED TO THE INTERESTS OF RAILWAY ROLLING STOCK.

Vol. II.
N.o . 2

AUGUST, 1871.

50 Cents per Annum.
Single Copies, 10 Cents.

Narrow Gauge.

A CORRESPONDENT of the New-York *Tribune* gives the following statement of the comparative merits of the narrow and broad gauge for railways:

"The subject of railways with gauges narrower than the present standard has already, in this country, become of very great importance, and many professional and amateur engineers have rushed into print with statistics to show the immense superiority of such roads, in economy of construction and actual carrying capacity. It has been reserved for the Denver and Rio Grande Railway to demonstrate, practically, how such economy is effected, and in what manner it is proposed to make their road, constructed on the three-foot gauge, as efficient, in point of carrying capacity, as roads of standard gauges, as at present conducted.

"While the discussion has proceeded in papers, magazines, and pamphlets, the builders of the Denver and Rio Grande line have been steadily at work, until now the first 80 miles of the line are graded, bridged, and tied, rolling stock completed, and nothing but the perverse delays in the arrival of the iron hinders the completion of the road and its opening for traffic.

"The construction and capacity of this rolling-stock alone furnish the solution of these two questions of economy and capacity, and the statistics below given will prove of very great interest to every one who knows what a railway is.

"The engines adopted for this gauge are of the same patterns as the standard engines in use on the Pennsylvania Railroad, with but slight modifications, and were adopted after a careful comparison of those in use on both foreign and home roads.

"The passenger-engines have four driving-wheels of 36 inches diameter, and one pair leading-wheels, cylinders, 9 × 16 inches; weight on drivers, with water in the boilers, 20,000 pounds; total weight, 25,000 pounds. A four-wheeled tender accompanies it, weighing 15,000 pounds empty.

"Freight-engines have six driving-wheels, 36 inches diameter, with one pair leading-wheels; cylinders, 10 × 16 inches; weight on drivers, 25,000 pounds, and a total weight of 30,000 pounds. Tender weighs 15,000 pounds empty.

"In the construction of passenger-cars, there has been, perhaps, too much deference paid to prejudices in favor of existing patterns to obtain the full benefits of the narrow-gauge system. These cars have the following dimensions: Length, 35 feet; length, including platforms, 40 feet; height inside to centre of dome, 7 feet 9 inches; diameter of wheel, 24 inches; height of floor-beams above rail, 27 inches; capacity, 35 passengers. These cars are handsomely finished in the style of the Pullman car, and give the same seating-room as the cars of the Pennsylvania road. They are thoroughly ventilated and comfortable, and are eight-wheeled, with an arrangement of springs which makes them very easy on track. Their weight is 16,000 pounds. Freight-cars are made of present patterns, but are four-wheeled. They weigh but 4000 pounds, while having a capacity of 10,000 pounds.

"This is but a short and imperfect description of this rolling-stock, but is necessary to a ready comprehension of results given below—results based on actual comparison of actual power of engines, and actual weights of rolling-stock on the 3-foot and 4-foot-8½-inch gauges respectively.

"We have taken the Pennsylvania Railroad for purposes of this illustration, because it is ably managed and near at hand. The standard passenger-engine in use on that road has a weight on drivers of 40,000 pounds, or just double the capacity of the engine on the Denver and Rio Grande, but has a total weight, including tender, of 105,000 pounds, or 52½ tuns.

"Their usual local passenger train consists of,

	Tuns.
Four passenger-cars, seating 53 passengers each, and weighing each 40,000 pounds, or 20 tuns	80
One baggage-car	14
One engine and tender	52½
Total	146½

"This train will accommodate 212 passengers, if full.

"To carry the same number of passengers on the three-feet gauge, we require,

	Tuns.
Six passenger-cars, seating each 25 passengers, and each weighing 8 tuns	48
One baggage-car	4
One engine and tender	20
Total weight	72

or less than one half the total weight of the train on the standard gauge. Then, since the smaller engine has one half the power of the larger, it follows that it can readily take its load wherever the larger engine can go; and, on the authority of W. Baird & Co., who, from their long experience, may certainly be considered trustworthy in such matters, can take it at a speed of 36 miles per hour, as readily as the other can run 40 miles per hour.

"But follow this out in freight traffic, which is the paying traffic of any road, and see the result.

"The capacity of the freight-engine on

Three-foot gauge is, on average low grades	405	tuns
Deduct cost of engine and tender	22½	tuns
Leaving for load	382½	tuns
Cars weigh 2 tuns to carry 5 tuns; of this load then 2-7 would be cars, or say	108	tuns
Leaving for paying freights	270	tuns
On standard gauges freight-engines having double the weight on drivers will have double the capacity, or	810	tuns
Deduct engine and tender	60	tuns
Leaving for load	750	tuns
Cars weigh 10 tuns and carry 10 tuns, then of load one half will be weight of cars	375	tuns
Leaving for paying freight	375	tuns

"This shows an actual capacity for the narrow-gauged freight-engines of nearly three fourths that of an engine of more than two and a half times its weight.

"But we have supposed, in this case, that cars on both gauges are always filled, which, unfortunately, is far from being the case. Statistics show that, on the standard gauges, more than four tons of dead or non-paying weight are annually carried over these roads to each ton of paying freight. In other words, the average amount of freight carried in each car is but one fourth of its capacity. Allowing that this discrepancy may extend to the three-foot gauge also, which, from the smaller size of the cars, can scarcely be expected, and this is the result:

THREE-FOOT GAUGE.

Cars weigh two tons, and have capacity of	5 tuns
Then in load as above of	382 tuns
There will be weight of cars	234 tuns
Leaving weight of paying freight	146 tuns

FOUR-FOOT-EIGHT-AND-A-HALF-INCH GAUGE.

In load as above of	720 tuns
Weight of cars	600 tuns
Weight of freight	150 tuns

Or only four tuns more than on the narrow gauge.

"This, then, is the practical result of the narrow-gauge theory, and from this follow naturally all the principles of economy in construction and operation, cheap freights, large dividends, its adaptability to other than mountainous countries, the feasibility of doubling the number of miles of our railway systems at no more than former outlay, the easy development of sparsely settled but valuable districts, and all the long train of advantages which will acrue to the stockholders of such paying roads, as well as to the people along their routes."

Railway Progress.

WE copy from Poor's *Railway Manual* the following statistical table, showing the progress of railways in the United States during the past forty years:

Year.	Miles in Operation	Annual increase of Mileage.	Year.	Miles in Operation	Annual increase of Mileage.
1830	23	..	1851	10,982	1,961
1831	95	72	1852	12,908	1,926
1832	229	134	1853	15,360	2,452
1833	380	151	1854	16,720	1,360
1834	633	253	1855	18,374	1,654
1835	1,098	265	1856	22,017	3,643
1836	1,273	175	1857	24,508	2,491
1837	1,494	224	1858	26,968	2,460
1838	1,913	416	1859	28,789	1,821
1839	2,302	389	1860	30,635	1,846
1840	2,818	515	1861	31,256	621
1841	3,535	717	1862	32,120	864
1842	4,026	491	1863	33,170	1,050
1843	4,185	159	1864	33,908	738
1844	4,377	192	1865	35,185	1,277
1845	4,633	256	1866	37,017	1,832
1846	4,939	297	1867	39,244	2,227
1847	5,599	669	1868	42,277	3,033
1848	5,996	397	1869	47,254	4,999
1849	7,365	1,369	1870	53,399	6,145
1850	9,021	1,656			

Among the Car-Shops.

We copy the following car-shop notes from the *Chicago Railroad Gazette*. The shops are located respectively at New-Haven, Springfield, and Worcester:

NEW-YORK AND NEW-HAVEN SHOPS.

The car department of this road is under the direction of Mr. M. L. Andrews. He is building some new passenger-cars, and is now putting up the frame of a director's car. He has also an iron freight-car nearly completed, which was designed and patented by Dr. Lamoth, of New-York. This is built upon a very novel plan, the framing consisting of gas-pipe and steel-rods, united together in a very ingenious way. One of these cars is now running on the road; but this second one is intended to be an improvement on the first. Its weight, after its completion, will furnish the best test of the value of the plan. If its weight is considerably less, in proportion to the load it carries, than that of ordinary cars, it will be a strong argument in its favor.

Mr. Andrews is also using an ingenious contrivance for opening the windows in the raised roof of his cars. One half of the number of windows on each side open in one direction, and the other half in the opposite way. This is all done by one lever, and it is so arranged that the windows can be moved any desired distance. By this means a smaller or larger opening can be provided for ventilation, as may be required by the weather or the number of passengers in the car.

Mr. Andrews has also designed a passenger-car truck which possesses some novelty, and is said to ride easier than others on his road. Both the machine and car-shops of this road have an appearance of neatness and cleanliness which indicates good management, and present a favorable contrast to some of those which we visit, where apparently there is no place for any thing, and where every thing seems to be where it does not belong. The shops are located next to the water, and we could not help thinking that some of the homesick New-Englanders in the Western States would have been wonderfully revived by the salt breeze which circulated through every part of the establishment on the warm day of our visit.

BOSTON AND ALBANY SHOPS.

This department is under the management of Mr. F. B. Adams. He is building passenger-cars at the rate of one per month, and baggage-cars as they are needed. The passenger-cars are made 54 feet long over the body, and 9 feet 10 inches wide, with four-wheeled trucks. They are made with 8 longitudinal sills, those outside 5½ by 8 inches and those inside 4 by 7 inches. The flooring is made of 2 courses of 1½-inch stuff, with tarred paper between. The first course is of oak, the second of yellow pine. The outside of the cars is finished very plainly, with the joints of furring covered with iron straps. The inside is beautifully finished with a variety of woods, some of it California redwood, which in combination with some others of dark color makes as beautiful a contrast as I have ever seen in this kind of work.

Mr. Adams is also putting openings over the front and back windows for ventilation, an arrangement which will give very good results if it is only properly attended to.

In the construction of freight-cars he has made some changes from ordinary practice. He puts the outside boarding horizontal instead of vertical. One reason for this is, that on taking out and replacing a sill, only a few of the boards will be spoiled by nail-holes, whereas when all the boards are vertical and nailed to the bottom sill, many of them are spoiled by drawing the nails. He is also of the opinion that horizontal boarding gives greater strength to the framing. The doors are made of ceiling with rails fastened on the inside by clinch-nails, and without any framing.

Mr. Adams showed a model of a truck, which was nearly completed, and which he expects to exhibit at the Car-Builders' Convention. One novel feature in its construction is that all the iron-work is put together with thin India rubber cloth between. This, he thinks, will give a better bearing to the parts and to a great extent prevent the bolts and nuts from working loose.

OSGOOD BRADLEY'S CAR-WORKS.

About 120 men are employed in this establishment, which is said to be the oldest in the country. They have the following work in progress: 2 drawing-room cars for Wagner's New-York and Boston line, each 45½ feet long by 9½ feet wide; 6 passenger-cars for the Burlington and Missouri River Railroad of Nebraska; 3 for the Buffalo and Washington road, 49½ feet long by 10 feet wide; 2 for the Boston and Providence; 2 for the Portland and Ogdensburg; 6 twelve-wheeled cars for the Maine Central, to be 56 feet long by 9½ wide, and to seat 72 passengers each; two twelve-wheeled passenger-cars, 200 freight, 100 dump, and 100 flat cars for the Boston, Clinton, and Fitchburg road; 2 passenger, 1 baggage, 10 box, 10 flat, and 10 dump-cars for the Boston, Barre, and Gardner road, and 1 baggage and 10 box-cars for the Buffalo and Washington road.

English Railway Laws.

The New-York *Journal of Commerce* informs us that "England has certain laws regulating railway travel which strike Americans as odd. In that country a man must not jump on or off a train while it is in motion; if he does, he is hauled before a magistrate and fined. At a recent session of a London police court two cases came up, and were disposed of as follows: As the Windsor train was approaching the Clapham Junction Station, the driver, not being able to see the signals through the fog, slackened speed. A passenger, being in a hurry to get off, jumped from the train while it was still moving, before it had reached the platform. He pleaded that he thought the train had stopped. The magistrate fined him a small sum and costs. In the second case, a workingman was waiting for a train at the Battersea station. On its arrival, but before it had stopped, he rushed to get on, and fell between the platform and the carriages. He was picked up, taken before the magistrate, and had to pay a fine for his headlong temerity. In this country one of the inalienable rights which every American exults in possessing, is that of risking his own neck or limbs at pleasure. He may scramble on or leap from a train moving twenty miles an hour, or make the wildest of bounds for a ferry-boat after it has left the slip, and that is nobody's business but his own; unless he happens to be harmed by the rash attempt, in which event his first impulse is to consult a lawyer to see whether the railroad or ferry company can not be made to pay damages. But that he has not a perfect right to take the hazard of being chopped to mince-meat under the wheels of a flying train, or to bury himself fathoms deep in the mud of an East River slip, is a thought that never enters his head. Without troubling ourselves to discuss the question of a man's right to take his own life, or cripple himself—which, on grounds of the general public welfare, we deny *in toto*—it need only be said that the English system of punishing the rashness of railway passengers has a good effect. The Englishman most prone to saltatory feats pauses before he tries to execute them on railway trains. It is not merely that a fine and payment of costs await him, but that he is detained by the arrest and examination before a magistrate, after a lock-up, perhaps, over night. For the few seconds that he would have gained by leaping from a train before it had stopped, he pays by the loss of a day or night, to say nothing of money out of pocket by the fine. This is a practical and persona application of the venerable maxim, 'More haste, less speed,' which the dullest of mortals can appreciate. Our own opinion is that the fewer hinderances and obstructions placed by railroads and ferry companies on the free movements of passengers the better. We are opposed to the excessive precautionary measures of locking up cars when in motion, and of erecting iron barriers at ferry-docks, thus fettering the free motion of a thousand persons of sense in order that one foolish individual may be kept from hurting himself. The desired end could be reached much more easily by proceeding against the one foolhardy or stupid man who makes all these contrivances necessary, than to subject the thousand sensible people who need no protection to so much inconvenience and bother. Theoretically, the English system may be objectionable to our high-pressure views of personal liberty, but practically it is an excellent one."

A Cheap Locomotive.

The following letter of Mr. A. J. Cassatt, General Superintendent of the Pennsylvania Railroad Company, to Messrs. Baird & Company, of the Baldwin Locomotive Works, dated Altoona, Pa., June 12th, 1871, tells an interesting story of a faithful dumb servant of the steam demon and of man. We print it both for the benefit of its fellow-locomotives, that they may, in Scripture phrase, 'go and do likewise,' and to the credit of its birth-place, the great workshop:

Engine 422 has been taken into the shop for repairs, and as her performance has been an extraordinary one, you will, I am sure, desire to know some of the particulars of her career thus far.

She was placed on the road on the 17th day of October, 1867, and ran until the 14th day of May, 1871. During the whole of this time she hauled fast and heavy passenger trains over the Middle Division, and made the wonderful run of 153,280 miles, losing only three trips, which was during November, 1869, to have six new flues put in and to clean the mud out of the waist of the boiler. She lost also six round trips in May, 1870, getting a larger tank, to enable her to make the run from Altoona to Harrisburg (132 miles) without a stop.

This, however, was no fault of the engine and should not be counted against her.

As an offset against the nine trips lost, she made eleven and one half extra trips between Altoona and Harrisburg.

The total cost for repairs up to the time she was laid off amounted to $3727.06, or 2.44 cents per mile. Our book account makes these amounts somewhat greater; but I have deducted all items not actually running repairs, such as the new tender, cost of applying air-brakes, etc., which, although under our system of accounts are necessarily charged to repairs, actually do not belong there.

When Engine 422 was taken into the shop, she was reported as run down in the working parts, but uniformly so; all the bearing-surfaces being smooth and good, and her general condition being better than is usual with engines taken in for repairs. The cost of placing her in thorough repair is estimated at $1262.73.

Narrow-Gauge Locomotives.

There has just been finished at the Baldwin Locomotive Works, a narrow (three-foot) gauge locomotive for the Denver and Rio Grande Railroad. It is stated to be the first narrow-gauge locomotive for general passenger or freight service built in this country. The engine is six-wheeled, four of the wheels 40 inches in diameter, being coupled as drivers, and the one pair of leading-wheels so arranged as to enable the engine to pass short curves readily, as the rigid wheel base is only 6 feet 3 inches. The general plan is similar to that of ordinary full-gauge locomotives. The cylinders are outside and placed horizontally, and are 9 inches in diameter by 16 inches stroke. Its total weight in running order is 25,300 pounds, of which 20,500 are carried on the four driving-wheels and so available for adhesion. A four-wheeled tender having a water capacity of 500 gallons, and a coal capacity of about 1½ tons, is attached. The proportion of driving-wheels relatively to the stroke of piston admits of a speed of 30 to 40 miles an hour, with equal facility as on the full gauge. Two freight locomotives, having each three pairs of drivers and a pony-truck, are also just finishing for the same road.

Car-Painting.

At the meeting of the Master Car-Builders' Association, in 1870, a committee was appointed to report upon car-painting. Numerous circulars were sent by the committee to members of the association and others, soliciting information upon sundry specified points. Only eighteen answers were received, and upon the information contained in these, together with their own experience, the committee made a report at the recent meeting, in Richmond, which is substantially as follows:

For primary coats and foundation, some have used a liquid filling on common work to fill and fasten the grain, and when dry put on a coat of thick lead-paint, and scrape off at once from the raised parts with a broad knife. This method has proved successful when used, and dispenses with rough stuff. A trial of this is recommended on ordinary work.

The object of rough stuff is to level and smooth the surface, and should be composed of materials that will dry hard and have the greatest durability. The following mixtures for this purpose have been selected:

Mixture No. 1: Equal proportions of dry white-lead and Rochelle ochre. Tint to match body-color to save coats. Liquids, two fifths Japan, two fifths turpentine, and one fifth linseed-oil. Mix well, and run once through the mill, and then add one fifth hard drying body-varnish, and temper with turpentine.

Mixture No. 2: To one gallon best rubbing-varnish and one pint of best Japan gold size, add twelve pounds of B. B. lead, and Rochelle ochre sufficient to make a stiff paste. Temper with turpentine. This will do for the first coat. For the second coat, use the same ingredients, less nine pounds of lead.

As a substitute for rough stuff, use three quarters dry white-lead and one quarter whiting. Tint to suit body-color, and mix two fifths Japan, two fifths turpentine, and one fifth raw linseed-oil, and run once through the mill; then add one fifth hard drying body-varnish, apply with a brush heavy, let it set for a short time, and then scrape off with broad putty-knives from the raised parts, leaving a smooth, level surface. After scraping, allow thirty-six hours to dry. This method will save time, labor, and rough stuff.

As to whether old paint can be rubbed down and new paint applied with economy and safety, much will depend on the old paint. If it has a tendency to shell or blister, it can not be done with safety, for it will blister again, no matter how many coats you apply. But if the old paint is sound and adheres well to the wood, it is economy to rub down and repaint; but if cracked through to the priming, it is not economy, as the under coats will contract and show the cracks through the top coat, no matter how well filled.

For removing old paint heat is the best agent. Gas, if convenient, may be used, or alcohol lamps, or a charcoal furnace, say twelve inches high, eight inches wide and deep, made of sheet-iron, with a handle and rest. Scrape off with a chisel formed for the purpose. If the furnace is used, one man will be required to hold it and another to scrape off when blistered. Care should be taken not to char the wood-work. Potash should not be used to remove paint from wood, as it will soften it and prevent paint from drying over it.

The cracking of paint is usually caused by applying one coat before the previous one is dry. Sometimes it is caused by using too much oil after the priming, and sometimes by poorly boiled oils, which should never be used where paint is to be varnished. Raw linseed-oil should be applied in all cases, and as little as possible after the first coats are on, using zinc colors on all passenger-car work. With good stock and good workmen, paint and varnish should not crack.

The use of rubbing varnish depends on the time and the number of coats to be applied. When work is to be finished with two coats, and proper time is allowed for the first coat to dry, wearing body-varnish should be used. If the first or second coat of varnish is not dry, it will sweat through and absorb the top coat, causing it to flat, and often to crack and blister, which in all cases is caused by some of the under coats not being dry.

The life of varnish on the various roads heard from ranges from five to ten months, safe wear.

M. C. Andrews,
C. D. Mills,
R. S. Ramsey,
L. Garey,
} *Committee.*

The Hudson Highland Suspension Bridge.

Several prominent engineers are engaged in perfecting the plans for this important engineering work across the Hudson River, between Fort Clinton and Anthony's Nose, and the work will soon be commenced, with the intention of having it finished by the summer of 1875.

Comparatively little masonry will be required in the abutments, as the solid granite mountain bases on either side afford excellent natural supports. The length of the bridge between the towers will be 1666 feet; total length, including approaches 2449 feet; height above the water-level, 155 feet; safe working load for the railway trains, 2400 tons; safe working load for highways, 2880 tons; load that would break the bridge, 25,171 tons. Two granite towers of immense strength will be built on each abutment, and will rise 280 feet above the water-level. Over these will be strung the upper main cables, the ends of which will be deeply anchored in the solid granite mountain side. There will be 20 main cables to four systems, each cable being about 14 inches in diameter and composed of a new steel combination wire in many strands. These cables will contain 371,195,750 feet, or about 70,302 miles. The total weight of iron and steel used will be 17,005 tons, with a suspended weight of 9651 tons. The total amount of masonry will be 58,048 cubic yards. This structure will be a combination of truss and cable, and will safely support a train of 60 cars and 35,000 people. The amount of weight that could be crowded on it at once will be but one sixth of its supporting capacity. There will be two decks, or floors, the upper for the railroad, the lower as a highway. The elevation above the water-level is far higher than the tallest masts of passing vessels.

Breaking of the Winona Bridge.

The following account of the breaking of a pier of the new bridge over the Mississippi River at Winona under a train consisting of a locomotive and six flat cars loaded with stone, on the afternoon of the 27th ult., we extract from the Winona *Republican:*

"From Mr. Huxley (the engineer) we learn that, at the time of the accident, the locomotive was within eight or ten feet of the middle pier. He was looking back at the bridge, and the first thing he saw was the timbers on the east side spreading out, and at the same time he felt the bridge sinking. One glance ahead showed that the track was clear, and opening the valve he let on a full head of steam. The engine bounded forward, snapping the coupling-pin that attached the tender, and reached the other side of the pier just in time to avoid crashing into the heap of ruins below. The cool heroism of Huxley in this trying moment can be commended with a good grace. Many men of less nerve would have jumped from their post and let the engine go.

"All who saw the bridge fall, unite in saying that the break first took place near the middle pier, not far from where the locomotive was. The bottom and side timbers first appeared to give way, and then the whole span went down. Just what caused the accident no one can probably tell. The bridge had not been finally keyed up and adjusted, but it was believed to be perfectly safe."

There are some fears of a peanut famine. North-Carolina sends but 2000 bags this year against 20,000 for the same time last season, and the supply from Virginia is short one half.

Hinkley & Williams's Works, Boston.

Those who know this establishment only by the engines built there when the firm was Hinkley & Drury, have no idea of the kind of work which is done there now. The design of the locomotives which are turned out there now is entirely different from that of former days. The shops have been supplied with the latest improvements in tools and machinery for doing work in the best manner.

Mr. H. L. Leach is Superintendent, and Mr. Frank D. Child, Chief Draughtsman. Together they supply what is needed in every locomotive and machine-shop, that is, the skill to plan and the ability to execute. The more recent work of this establishment shows that it has been designed with that sort of mechanical instinct which resembles so much, if it be not identical with, the "art faculty." Work of this kind is not highly ornamented, but there is about it a sort of refined adaptation of means and ends. There is no sacrifice of utility for ornament, but every part is so proportioned and arranged as to do the very best thing in the very best way, and in doing so it assumes a beauty of its own which is not often aimed at when the work is designed.

Having said this much, we must also add, that the merit of the Hinkley locomotives is not in their appearance only. They have been steadily growing in favor, and have long been noted for good boilers, which are not surpassed, if equaled, by those made anywhere else in the country.

In these shops 375 men are employed, and are at work in the following order: 8 mogul engines for the Chicago, Danville, and Vincennes Railroad; 2 four-wheeled switching-engines for the New-York Central; 1 eight-wheeled engine, 16 × 21 inches cylinder, for the Fort Wayne, Jackson, and Saginaw; 5 of the same class for the Chicago and Iowa, and 4 for the Burlington, Cedar Rapids, and Minnesota.

The York, Pa., *Daily* contains the following: "Among those whose practical minds have grasped the idea as feasible, and destined to work a revolution in railroading in this country, so far as cheapness of transportation and economical construction are concerned, is our wide-awake firm of Billmeyer & Smalls, who are even now showing their faith by their works, and erecting what will make, when finished, as it soon will be, the largest car establishment in this part of the country. This new structure, independent of their already more than extensive works, will be brick, 60 feet front by 170 feet in depth; and when finished will be supplied with all the machinery and fixtures of a first-class shop, and be ornamental as well as useful. This building is designed exclusively for the manufacture of narrow-gauge cars, and will be capable of turning out from 10 to 30 new cars each working day. The energetic chief of this firm, Mr. D. E. Smalls, has the honor to be, with General Palmer and others, a pioneer of the narrow-gauge railroad interest in America, and through him his firm have secured the building of the first 100 narrow-gauge cars ever used in this country, most of which are already far on their way to the Rocky Mountains. They are for the Denver and Rio Grande Railroad, which we have before referred to."

An instrument has been invented that marks "the ebb of time," showing how many minutes there are prior to any event. If placed in the post-office, it reads: "Mails open in 30 minutes;" one minute later it reads: "In 29 minutes," then in 28, and so on. At a railway station it reads: "This train leaves in 10 minutes," then in 8, etc., and when the index reaches 0, the train starts. Thus, any passenger, on entering a station, knows just how much time he has for getting tickets, checks, a newspaper, and a seat, without consulting a watch or a clock to ascertain the hour of the day.

The Vanderbilt Railroad Depot.

THE city of New-York can at last boast of a railroad depot worthy of the commercial metropolis of the country, and adequate to the wants of that portion of the public who travel by the Hudson River, Harlem, and New-Haven lines. The inferior, shabby, unattractive, and ill-ventilated structures in use hitherto for the accommodation of the traveling public, are dwarfed into insignificance by the splendid new Union Depot just completed by Commodore Vanderbilt and situated on Fourth avenue and Forty-second street. Its architectural features within and without are imposing and beautiful, and its magnitude is such as to afford ample room for the ingress and egress of the numerous trains which concentrate from the above-named roads. It covers some five acres of ground, and contains about one hundred rooms. The tracks in the vicinity are provided with automatic signals to indicate the approach of trains and guard against accidents. We copy from the New-York *World* the following description of the building: "The new edifice is designed for the accommodation of all the roads that have a terminus in the city, and is provided with the necessary waiting-rooms and ticket-offices for the different passengers, as well as the lines of track for the various trains. The building proper, which extends from Forty-second to Forty-fifth street, is 692 feet in length and 240 in width. The materials used are smooth red brick and iron painted white. The front, or principal elevation, is on Forty-second street, and rears its magnificent proportions high in the air, presenting a most imposing appearance. The centre of the façade is covered with a tower 130 feet in height, and flanked at each end by towers 110 feet high. The west elevation, as seen from the new street formed by the depot, exhibits similar features, and is surmounted by three towers 110 feet in height. The north end is constructed entirely of iron, and has ten huge iron arches for the ingress and egress of trains; while the eastern side, which is the least imposing, is for the most part built of brick, and will be used chiefly for the freight department. On the south side, fronting on Forty-second street, the whole width of the building, to the depth of forty feet, and to the height of three stories, is devoted to the waiting-rooms and offices of the New-York and New-Haven railroad. On the ground floor there is, first of all, an ample baggage-room; next, the gentlemen's waiting-room and that for ladies. These rooms are handsomely fitted up in black-walnut and oak, and supplied with every convenience. Adjoining the ladies' waiting-room is the ladies' dressing-room, which is furnished with all the modern conveniences, and is a model of elegance and luxury. On the second floor are the offices of the superintendent, the stationery and store-rooms, the chief clerk, treasurer, attorney, president, and the directors. On the third floor are the conductors' room, store-room for tickets, general ticket-office, printing-room, and five small offices for undetermined purposes. The west side of the building, for its entire length, to the same depth and height as on the south side, is similarly designed for the business and traffic purposes of the New-York and Harlem Railroad, the Hudson River Railroad, and the New-York Central Railroad. In this way the west and south end, to the depth of forty feet, are occupied solely by offices, and the central space, 650 feet by 200, forms a monstrous car-house, to which admission is gained by the ten iron arches at the north end of the building. The height of this immense car-shed is ninety feet. The roof is formed of glass and corrugated iron, and is supported by thirty-one semi-circular trusses of iron, each measuring four feet in width by one foot in thickness. These trusses are painted in rich colors, and on the lower sections there is a good deal of gilding, while the iron sheeting extending between the arches is painted a blue tinge. The effect of the whole is perfectly gorgeous. At night the interior is lighted up by twelve chandeliers, each provided with one hundred lights and a large reflector. High up on the walls, in letters six feet high, are inscribed the names, "C. Vanderbilt, President; W. H. Vanderbilt, Treasurer." There are twelve lines of railway running the entire length of this stupendous shed, divided into groups of two or three by raised platforms, composed of stone and cement, for the accommodation of the four lines which start from the Union Depot. At the south-east corner of the building, at the junction of Fourth avenue and Forty-second street, are two lines of railroad, which form the terminus of the Fourth avenue railroad, by which passengers will be enabled to step on board the steam-cars from the street-cars without exposure to the weather."

Stinard's Steam Railway-Brake.

A WRITER in the Whitestone, N.J., *Herald* thus refers to this brake:

"The engineer is the first person to see danger, and he is the proper person to have the control of stopping the train, which he can do very quickly if he has the Stinard brake applied to his engine and cars. Underneath the foot-board of the engine is a steam cylinder about eighteen inches long. There is a lever connected in the centre with the piston, one end made stationary, and the other end connected with a rod running under the car to a sway-bar; one end of the sway-bar has a rod running to and connecting with the Miller buffer, by means of an equalizing lever. The centre of the sway-bar being connected with a slide-bar that the hand-brake is connected to, the motion of the car is conveyed from the buffer to the sway-bar, giving an opposite motion to the main rod, so that when the train spreads in starting, the rod, moving in an opposite direction, keeps a taut rod under all the cars, while the slide-bar stands perfectly still where the hand-brake is connected. Each car is provided with the same apparatus. Thus the whole device, when the power is applied, adjusts itself so that every brake is put on with the same power at the same instant. Having no chain connections, the steam throws off the brake as easily as it puts it on. The rods running under each car are connected together when the cars are coupled by means of a simple pin; thus making a continuous rod from the engine to the rear car of the train."

New Steel Rail-Mill.

THE new steel rail-mill at Bethlehem, Pa., now erecting by the Bethlehem Manufacturing Company, under the direction of John Fritz, their Chief Engineer and Superintendent, will be, when done, the largest in this country, and one of the largest in existence. It consists of a building 105 feet wide, spanned by an iron and slate roof without supporters. It is 30 feet high to the eaves, and is in the shape of a cross, of which the long arm will be 900 feet and the short arms 142 feet each, making 1184 by 105 feet area, or nearly three acres covered. This is only surpassed by the mill at Creusot, in France, which consists of three buildings 60 by 1400 feet each.

The capacity of the works is to make 300 tons of steel ingots per day; but at present machinery will be erected for rolling but 100 tons of rails, or more than double the capacity of the largest mill yet erected. There will be eight 5-ton converters and two train rolls, one of 24 inches and one of 28 inches diameter, driven by two condensing engines of 48 and 56 inches diameter of cylinders and 44 and 48 inches stroke.

This mill will be remarkable not only for its enormous size and capacity, but for the many new labor-saving conveniences introduced into the design of the plant by the engineer, Mr. Fritz, who has examined personally all the Bessemer steel-works both here and abroad before designing this.

It is the opinion of experts who have seen it, that it will turn out more tons of steel rails with less manual labor than any other mill has ever done.—*Chicago Railroad Gazette.*

MR. DANIEL TORRENCE, of New-York, has been elected President of the Ohio and Mississippi Railroad Company, *vice* Mr. William D. Griswold, resigned.

The First Narrow-Gauge Cars.

THE Jackson and Sharp Company, of Wilmington, Del., has just completed and sent to their destination a set of narrow-gauge cars for the Denver and Rio Grande Railroad in Colorado. The Wilmington *Commercial* contains the following description of them:

"The train now built includes two first-class passenger-cars, two smoking-cars, and two baggage and mail-cars. The passenger-cars are in their outward appearance, in every thing except size, precisely like other first-class cars. In their internal arrangements, however, they are necessarily quite different. The width of the car allows but three seats across the car, a double seat on one side of the aisle, and a single seat on the other. To balance the cars, the double seats from the middle to one end of the car are arranged on the right side of the car, and from the middle to the other end on the left side. These cars are divided by a partition into two apartments; but this, of course, would not be necessary if the company felt able to run an entire car devoted to the exclusive use of ladies. The windows of the cars also let down with a strap like coach windows, instead of sliding up as they do in ordinary cars, and we do not see but what the lowering plan is the best, after all. The cars are elegantly finished inside, in walnut, Hungarian ash, etc., and are painted, inside, of a rich, dark green, relieved by gilt.

"The smoking-cars are quite differently arranged, and have walnut and ash seats, (such as we now see in many of our city street-cars,) running lengthwise back to back, the whole length of the car, so that passengers face the windows. The baggage and mail-cars differ in nothing except size from the similar cars of the ordinary gauge.

"The baggage and smoking-cars have each but four wheels, but the passenger-cars have eight wheels, as is used with the larger cars. The wheels for all of them are manufactured by the Lobdell Car-Wheel Company, of this city, from models made expressly for the new gauge.

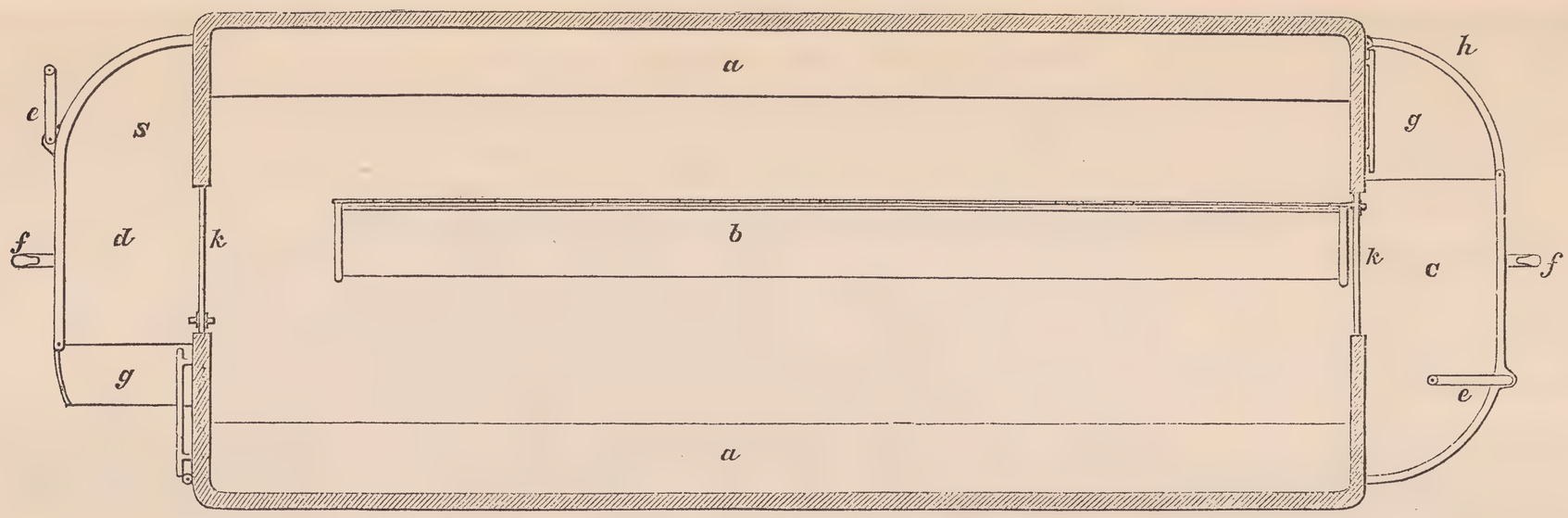
"These cars are but the forerunners of many more, for the Jackson and Sharp Company has already received orders for about twenty cars for narrow-gauge railroads, and has several of the number now under way.

"The roads ordering them are that already mentioned in Colorado, two roads in Georgia, one in Arkansas, and one in New-York State, and if the new grade is as successful as we believe it will be, the demand for this class of work will greatly increase. Wilmington has already got the lead, and will, doubtless, keep it; the cars we have just described being the first of the kind ever built in the world, and the first passenger-cars of any kind for a narrow-gauge railway ever built in America."

The Denver and Rio Grande road is projected to extend from Denver to El Paso, in New-Mexico, a distance of 850 miles, and will be tapped by numerous branch roads forming a net-work of communication throughout Colorado and New-Mexico. Messrs. M. Baird & Company, of Philadelphia, are furnishing the locomotives.

Earn what you Spend.

THREE fourths of the difficulties and miseries of men come from the fact that most want wealth without earning it, fame without deserving it, popularity without temperance, respect without virtue, and happiness without holiness. The man who wants the best things, and is willing to pay just what they are worth, by honest effort and hard self-denial, will have no difficulty in getting what he wants at last. It is the men who want goods on credit that are snubbed and disappointed and overwhelmed in the end. Happiness can not be bought by the bottle, nor caught up by the excursion train, nor put on with any robe or jewels, nor eaten at any feast. It does not exist in any exhilaration, excitement, or ownership, but comes from the use of the faculties of body and mind.



Plan of Improved Street-Car.

Improved Street-Car.

WE are indebted to the courtesy of the *Technologist* for the accompanying design of an *Improved Street-Car*, and we copy from that journal the following description of the same: "The design represents a car longer and somewhat wider than those now in use; *a* and *a* are side-seats for eighteen persons each; *b*, a middle seat for fourteen, made to slide lengthwise upon its supports to leave a passage at the rear end of the car; *c* is the front, and *d*, the back platform, with rounded corners; *e e* are the brakes; *f f*, the draw-hooks, and *g g*, the steps. The front platform is closed and the steps covered by a movable gate or fender *h*, hooked in loops provided; K K are the doors; the front one is to be locked. Passengers must enter and leave from the rear platform, behind the car, and outside the track. The conductor should collect the fares from in-going passengers, and remain at *s*. It is often proposed to divide the seats with slats, as in ferry-boats; but as the space must be wide enough for the largest person, this can not be done without allotting more space to each than most need. For narrow streets, as upon the projected Nassau street route, a narrow track, with light one-horse and narrow cars, is suggested, the seats to be in the centre, lengthwise, back to back, and covered."

The Pullman Company.

MR. CHARLES NORDHOFF writes as follows to the New-York *Evening Post:*

"The enterprise, which had a small beginning, with two cars and but little capital, is now successful. The Pullman Company are now running four hundred cars; have built forty new ones this year; are now completing seventy more, and have thirty more on the stocks. They run on almost all the railroads in the country, having made their arrangements with eighty-two different lines, which cover 45,000 miles of road. Most of the agreements with railroad companies are made for fifteen years, and the companies generally take stock of the Pullman Company to the amount of one half the value of the sleeping-cars they use. Thus their interest is mutual. I am told that many of the companies which had sleeping-cars of their own, have found it advantageous to make their arrangements with the Pullman Company; and certainly the public benefits by this, for travelers are not compelled to change from car to car, and may secure their sleeping and other accommodations when they buy their tickets.

"The Pullman Company now employs over 1400 persons, and large shops are to be erected at Chicago this year, where 1000 men will be constantly employed in the construction of these cars. On a single railroad, the Michigan Central, the Pullman Company has now $398,000 worth of cars. These the railroad company uses and keeps in repair. The Pullman Company furnishes their interior and keeps that in order, and the railroad company gives to the Pullman Company only the privilege of selling to the public what the railroad does not itself furnish; namely, sleeping accommodations.

"I am told that the dining-cars 'pay,' and that they will be gradually introduced on all the roads which use the Pullman cars. They are now in use on the Chicago and Alton, Chicago, Burlington, and Quincy, North-Western, Michigan Central, and some other roads, and meet with general favor, as they deserve."

A Newly Invented Rail.

LETTERS-PATENT have been taken out for a new rail for railroads, which promises to do away with the continual rattle and jar of railroad travel. It is a continuous elastic T rail, and the inventor and those who have examined the principle of its construction claim important advantages over any rail now in use. The rail is in two sections, the upper section lapping over the lower, and they are fastened together by horizontal bolts. Between the sections is an India rubber packing, five eighths of an inch in thickness. It is thought the use of this rail will prove important in many respects, and be much cheaper in the end than those now in use. The upper section may be made either of iron or steel, and when worn out can be relaid without disturbing the under section. A great expense will therefore be saved in relaying the track. The India rubber packing, it is contended, will give the car an easy and almost noiseless motion, and prevent the sharp concussions which so frequently result in the breaking of the axles. The saving every year to the rolling stock, it is claimed, will be an item of very great importance, and will commend the use of this improvement to all companies that study economy as well as safety. If the friction is lessened as much as engineers claim it will be by the adoption of this improvement, the duration of the rails will be greatly prolonged.—*Chicago Railway Review.*

A New Car-Wheel.

A NEW car-wheel, under the patent of I. B. Tarr, is being manufactured at the Fairhaven (Mass.) Iron-Works, and it is proposed to establish works especially for the production of the new wheel in that vicinity. The superiority claimed consists in greater strength, lightness, and smoothness of the tread. The process of manufacture is described to be substantially as follows: The melted iron, after being poured into the mould, is subjected to a pressure of many tons by means of a hydraulic press. All the gases are thus driven off and the iron is rendered more compact, homogeneous, and free from air-bubbles, beside being forced into every part of the mould. The wheel comes out perfect in form, and of uniform density and strength. This process, as applied to iron, is precisely similar to that mentioned by Bessemer in his address before the Iron and Steel Association of England, published in our columns some time since, as producing the happiest results in steel. It is, moreover, used elsewhere in this country for the production of particularly fine and sharp ornamental castings for door and other fixtures. Casting under pressure is not a novelty, although its application to car-wheels may be, and is likely to prove advantageous to the product.—*Iron Age.*

Feed-Water Heater.

THE Connecticut River Railroad is testing on their engine Whately a "feed-heater," the result of six successive inventions by I. P. Magoon, of St. Johnsbury, Vt. Thus far it works well. The Whately has done good service, but was getting a little lazy and apt to lose time; but, inspired by this invention, it is fully up to its work. A saving of fuel, however, is what is especially claimed for the "feed-heater." The water is pumped from the tank in the tender through a copper pipe, 1½ inches in diameter, to the "heater," which is a coil of pipe of the same size around the "cone-pipe" in the smoke-stack, and from this coil the water, heated to more than 200 degrees Fahrenheit during its passage through the coil, passes in a copper pipe on the side of the boiler opposite its passage when cold, and into the boiler. The heat used in raising the water to this temperature is waste heat, escaping through the cone-pipe. A portion of the "exhausted" steam passes through an extra "exhaust-pipe" to the "heater," and helps in the heating process. The water thus entering the boiler well advanced toward the state of steam, less fuel is required to bring it to that condition, and the hot water in the boiler is never set back by cold floods from the tank.—*Springfield Republican.*

One-Rail Railway.

A ONE-RAIL railway has been in successful operation between Raney and Montfermeil, near Paris, for two years. The locomotive for a one-rail road has four wheels, two being placed, one at the front and one at the rear of the engine, bearing on the rail. These give the direction, and are double-flanged. The other pair of wheels are placed in a transverse plane passing on a line in front of the fire-box. They run on oak-plank or macadamized road, as the case may be, and are the driving-wheels. This sort of railway can be built in France for about $1000 per mile. The locomotives weigh 6 and 10 tons; the former runs 14 miles an hour, drawing, besides its own weight, 35 tons up a grade of 2 feet in 100; the latter will draw 50 tons at a rate of 8 miles an hour up the same grade; on a level it would draw 180 tons. This system is the invention of M. Larmanjat, a French civil-engineer, and many believe that it may be successfully introduced on turnpike roads with the grades and curves which the common highway generally has.

TO CLEAN OIL-PAINTED SURFACES.—Take a piece of soft flannel, put it in warm water, and squeeze it till it feels dry; next dip it gently on to some very finely pulverized French chalk, and rub the painted surface with the flannel; the effect will be the removal of all dust, greasy matter, and dirt; the surface is next washed with a clean sponge and water, and dried with a piece of wash-leather. This method does not injure the paint like soap, and produces a very good result.

DANIEL MCLAREN, Esq., has been elected President and Superintendent of the Cincinnati, Hamilton, and Dayton Railroad.

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Engravings and Illustrations.

We would invite the attention of Master Car-Builders and others to the advantages to be derived from publishing in The National Car-Builder *engravings designed to illustrate the various features and details of car construction, and especially such improvements as can not otherwise be clearly presented. We will procure cuts to be made in the best manner from drawings or models that may be sent us, and charge only for the cost of engraving, inserting the same in our paper with suitable descriptive details, without charge. The cuts thus made by us, or that may be sent us for use in* The National Car-Builder, *will of course be returned promptly to the owner.*

Our readers will do us a favor by advising us of any errors they may notice in our directory of master mechanics and master car-builders. We desire to make it as complete and as reliable as possible, and with this view, we hope to receive early information of any changes that may be made, as well as inaccuracies in the spelling of names already in our list.

Poor's Railroad Manual.

This valuable publication for 1871-2 has just made its appearance, and forms a volume somewhat larger than its predecessor of last year. It bears evidence of having been prepared with great care and labor, and embodies a vast quantity of information, in the shape of statistics and otherwise, concerning the growth and present condition of our gigantic railway system. In 1851, there were in actual operation in the United States 8876 miles of railroad, the earnings of which, from passengers and freight, were estimated at $39,466,358. In 1870, there were in round numbers 50,000 miles of road in operation, the total earnings of which are estimated at $450,000,000, being an increase in twenty years of $400,000,000, or $20,000,000 annually.

Every completed road, as well as those projected or in process of construction, is noticed in Mr. Poor's volume, with the particulars respecting its financial condition, rolling stock, organization, offices, etc. It is a manual which is indispensable to every railway office and the commercial and business community generally, and must have an immense sale.

The Weight of Railroad Cars.

There is no subject connected with the operation of railroads which is now receiving so much attention as that which we have made the title of our article. This undoubtedly has been brought about somewhat by the extravagant claims made by the advocates of narrow-gauge railroads for their system. In this way the agitation has done good, just as homeopathy has influenced allopathic practice in medicine. The greatest good which has been done by the medical and the narrow-gauge discussion, is not, we think, attributable to the merit possessed by either of the new systems, but chiefly to the skill which the advocates have shown in detecting the faults of the old practice in both engineering and medicine.

If, as the narrow-gauge people argue, broad-gauge roads carry seven times as much dead as paying weight, then evidently they must be very expensive to operate, and *if* some narrow-gauge roads do not carry any more dead than paying weight, they must be much more economical than the first. The fallacy lies in the first *if*. All broad-gauge roads do not carry seven times as much dead as paying weight; and if they did, it does not therefore follow that they all *must* carry that much. If narrow-gauge cars necessarily do weigh much less in proportion to the load they carry than those for a wide gauge, or if the latter weigh a great deal more than the first *because their gauge is broad*, then the case is proved in favor of the narrow-gauge. There are, however, among experienced railroad men, many who still disbelieve that the latter is the case, and who hold to their convictions with sufficient firmness to assert that in order to build light cars it is not at all requisite to reduce the gauge. The clamor of the narrow-gauge people is beginning to wake up the conservatives of the old gauge, and they will be obliged to show what can be done in this direction. That many of the cars which are now running are much too heavy, there can be little doubt, and gradually we find that railroad managers are paying more attention to the *weight* of rolling-stock. If it were made more of a test of the merit of any plan or design, there can be little doubt that car-builders would soon find the means of making cars light without reducing their weight. Heretofore very little attention has been paid to this element, and consequently whenever a car breaks down from any cause, the broken part is often increased in weight and strength. This process is repeated on different cars until their weight has now reached its present limit. It is true, they are subjected to very rough usage, and that their strength must be sufficient to bear the unexpected emergencies of railroad traffic. It would be absurd to recommend that cars be reduced so much in weight as not to have strength sufficient to do the work required of them. What should be aimed at is to remove superfluous weight, or that which does not add to the strength. Suppose, for example, that a master mechanic or car-builder should take two trucks of equal strength and durability and weigh them. Obviously the one which weighs the least has, in that respect, an advantage which the other has not. Now, a comparison of the weights of all the different trucks which run on any line, would furnish much information regarding the most economical form of this part of a car. We seldom visit the car-shops of any railroad without finding a new pattern of car-truck, designed by some one connected with the road. Many of these trucks, if their weight was known and compared with that of others, would speedily be consigned to oblivion. The same thing is true of other parts of rolling-stock. So long as its weight is not a matter which receives any consideration, it is very apt to be unnecessarily heavy; but so soon as lightness as well as strength is required, material will be used more economically.

There is no field for invention more fertile, or opportunity for experiment so promising, as that of the design of cars. The only cause for fear is, that when once a reduction of the weight is made a distinct object, that then their strength may be sacrificed, and in that way the risk of accident and danger to life be increased. The advantage would thus be bought at too high a price. What is wanted is a more skillful disposition of material and better proportion of the different parts; for example, it is said that when car-axles break, the fracture nearly always takes place next to the hub of the wheel, showing that that point is the weakest. If, therefore, the axle were made heavier at that point, and lighter elsewhere, it would be stronger and no heavier. The same thing is probably true of many other parts, and it may be said of cars as Holmes wrote of chaises:

> "I tell you what,
> There is always *somewhere* a weakest spot—
> In hub, tire, felloe, in spring or thill,
> In panel, or cross-bar, or floor, or sill.
> In screw, bolt, thoroughbrace—lurking still.
> Find it somewhere you must and will,
> Above or below, or within, or without,
> And that's the reason, beyond a doubt,
> A chaise *breaks down*, but doesn't *wear out*."

The thing to do is to find the weakest points and strengthen them by taking material from where it is not needed, and using it where it is. The strength of any structure is only equal to that of its weakest part.

In the construction of passenger-cars much could be learned by comparing ordinary horse-cars with those for steam-roads. In the construction of the former, material is used much more economically than in the latter, simply because with them weight is an important consideration, whereas when cars are drawn by locomotives, builders are very apt to feel that it is not at all requisite to economize in weight. Most people can appreciate the expense when an additional horse is required to draw cars if they are too heavy; but the cost of increasing the weight of locomotives six or eight tons, and the consumption of that much more coal each month, is not quite so apparent to some people.

Corners.

We do no intend writing about the kind of corners which are made on Wall street by bulls and bears, but of the angles which car-builders put on the inside finish and mouldings of their cars.

Perhaps nothing which it is possible for us to write can make so strong an impression on our readers as the experience which we can all recall of having our shins, or perhaps "crazy-bone," come into violent contact with some sharp corner, or projection of a piece of furniture. Inasmuch as it is not saints alone who are thus disciplined, we are satisfied that the recollection of strong exclamatory interjections uttered on such occasions is still a burden to the consciences of many whom we address. We therefore trust that, if for no other reason but in the interest of morality, those of our readers who are car-builders will give us their attention.

What we want to say is that a sharp corner is always very uncomfortable, if the human body comes in contact with it. The same thing is usually true of those parts of furniture which conform to straight lines. Therefore in finishing the seats, and the sides of cars next to them, all corners should be rounded, and all straight lines be avoided if possible. Instead of this being the ordinary practice, the very reverse is the case, and car-builders seem to take pride in sharpening up the edges of mouldings, the arms to the seats, and especially the mouldings about the windows, with which the heads of passengers are apt to come in contact. It would make very little if any more work to round all of these, and make them smooth and comfortable to the touch.

That which is most aggravating to a tired and sleepy traveler, is the rigid straightness of the arms of car-seats. They dig into one's ribs, and come into contact with elbows and arms, until the sufferer is prone to resort to interjections again. Now, let any car-builder, who feels compassion for the sufferings of his fellow-creatures, and a disposition to alleviate them, take a ride in an ordinary omnibus, say such as run in Broadway, and if he can take a corner seat, he will find that it produces the most delightful sense of the fitness of things; that is, that he fits exactly into

the corner. If he takes the corresponding seat in a horse-car, there will be no such feeling, but, on the contrary, a sensation that he, a round man, has been placed in a square corner. The omnibus is curved in the back and end, so as to conform to the shape of the body, whereas the car has only straight lines.

What we desire to say interrogatively is, whether it would not be possible to make car-seats so that the sides would be curved to the shape of one's ribs, and upholstered so as to be a little less rigid than cast-iron with an excruciatingly sharp corner to it?

In building machinery, the best designers now round off all the corners where it is practicable. When done with skill and taste, it has a beauty of fitness which is more attractive than that which is only ornamental.

Who will earn the eternal gratitude of mankind by upholstering a car with the seats stuffed concave instead of convex? The traveling community should crown such a man with a wreath of greenbacks, and call his name blessed forever.

A Great Railroad Feat.

On Sunday morning, July 23d, between daylight and eleven o'clock, the gauge of the Ohio and Mississippi Railroad track, for a distance of 340 miles, was changed from six feet to four feet nine inches. This is, without exception, the greatest feat of the kind ever attempted. Every preparation was of course made in advance to facilitate the operation, and its accomplishment was so successful that the regular trains were expected to run by schedule time on the new gauge by the following Tuesday. The force of laborers was distributed in gangs of eight men to each mile of road, and there was no cessation of the work from its commencement until it was completed. Twenty-eight locomotives and fifty passenger cars, including baggage, mail, express, parlor, and sleeping cars, have been reduced to the narrow gauge, leaving seven hundred cars of all classes, and fifty-four locomotives, yet to be changed to the new gauge. The difference between the old and new gauge being fifteen inches, both lines of rails had to be moved instead of one only, in order to avoid throwing the weight of the trains too much upon one side of the track, bridges, etc. It is estimated that the entire cost of the change of track and rolling-stock gauge, including incidental expenses, will not be less than a million and a half of dollars. It is certainly a great feat, and if the sanguine expectations of the narrow-gauge advocates are realized in the future workings of our railway system, a good many similar feats will yet be witnessed. This one, however, will do for a beginning.

"The Roadmaster's Assistant."

This is the title of a little work by William S. Huntington, a copy of which has been sent us by the publisher, A. N. Kellogg, of the Chicago *Railroad Gazette*. It is compact in form, and may be carried in the pocket as conveniently as an ordinary diary; and as a manual of reference for all having to do with the permanent way of railroads it is indispensable, containing as it does a great number of practical suggestions and minute directions for track-laying, ballasting, and repairing. It is not designed for professional engineers, being free from technicality, and especially adapted to the wants and capacities of the average track-man, and calculated to aid him in correcting erroneous practices which at present prevail, and which tend to increase the expense of track repairs and liability to accident. It is provided with a copious index, by which ready reference can be made to any particular topic.

Mr. Charles E. Byers, Chief Engineer of the Philadelphia and Reading Railroad, and for twelve years in the employ of that company, died in Pottstown, Pa., on the 10th inst., in the 39th year of his age.

Test of Car-Axles.

We have before us the record of tests made of transverse strength of a *rolled and hammered* car-axle manufactured by the Pencoyd Iron-Works at Philadelphia, April 24th, 1871. The test was made by dropping a ram, weighing 1640 pounds, ten feet, the distance between the bearings being three feet. The axle was 4⅛ inches diameter, and stood fifteen blows before breaking, and the entire deflection, as it was reversed at every blow, amounted to 44½ inches.

A similar test of *rolled scrap* axle, the size and the conditions being the same as those above, showed less strength, the axle breaking at the eighth blow, the total deflection being 24 inches.

In another test of a *hammered* axle of 4 inches diameter, all the conditions being the same, the axle broke at the sixth blow, the total deflection being 19¾ inches. In still another test of a *hammered* axle, made of *charcoal blooms*, 3⅞ inches diameter, it broke at the fourteenth blow, the total deflection being 52¾ inches.

Messrs. A. & P. Roberts & Co., the proprietors of the above works, make weekly tests of the car-axles manufactured by them, and it is from the conscientious care taken by them in the selection and working of the metal that the axles made by them are so deservedly popular among railway managers.

We have seen a record of a series of tests made of bar iron, (wrought,) manufactured by the Messrs. Roberts, and used in the construction of bridges on the Catawissa Railway, with the following results per *square inch*:

Bar 1⅝	diam.	broke	at	66.208	lb.,	stretching 0.10
" 1¼	"	"	"	68.481	"	" 0.10
" 1⅛	"	"	"	64.940	"	" 0.07

These tests were made under the direction of Messrs. A. Whitney & Sons, car-wheel manufacturers, and the record is furnished by them, and therefore authentic in every respect. The practice of instituting frequent tests of the strength of railway materials, especially those so important for safety as axles and bridge irons, is to be commended, and we hope may be followed by other manufacturers.—*Railway Times.*

Car-Coupling.

Mr. John A. Mason, of Keokuk, Iowa, is taking measures to introduce a car-coupling of his invention, which, in general appearance, is somewhat similar to the Miller platform. There are compression buffers at the ends of the sills, immediately over the coupling-hooks, and the coupling is effected by hooks which spring sidewise, as in Mr. Miller's arrangement. The springs, however, for keeping the hooks together and preserving the coupling, are not attached to the draw-bar, but are spiral springs placed on a vertical shaft, with a hand-wheel, and from the shaft is an arm and link connecting with the hook.

The hook differs in form materially from Miller's, and no adequate idea of it can be given without a model or drawing. The inventor claims advantages for it, that automatic coupling may be effected though the cars vary eight or ten inches in height; that a much larger bearing-surface is secured, and consequently a more reliable connection; that on curves there is no danger of uncoupling; that there is no transverse strain, or shearing stress, of the draw-bar—and consequently it may be made much lighter—and that it is applicable to freight-cars, and as much "slack" as necessary can be secured.—*Chicago R. R. Gazette.*

New-York Viaduct and Narrow-Gauge.

A recent number of the New-York *Sun* says, "Have the directors of the Viaduct Railway considered the propriety of building it on a three-foot gauge, or one still narrower, say two feet eight inches?

"The passenger-cars of this railway will, of course, be constructed like those now in use on the Harlem and Hudson River lines for short distances in and out of the city. The seats for passengers will be longitudinal benches placed against the sides of the cars, just like the seats in our present horse-cars. All the space required will be enough for the conductor to pass between the two rows of passengers. This can be afforded by a three-foot gauge, or even by one of two feet eight inches.

"The advantage of constructing the Viaduct Railway in this manner will not only be that the cost of building the road will be less, but that more tracks can be placed upon the same breadth of surface. Six tracks of two feet eight inches gauge would occupy less room than four tracks of the ordinary gauge of four feet eight inches and a half. If the Viaduct were to have many short curves, it might be necessary to use the broad-gauge in order to allow a sufficient rate of speed; but as the curves will be few and large, this objection has no force."

It does not seem to have occurred to the editor in charge of the engineering department of the *Sun* that the tracks for the Viaduct road could not be placed nearer together by simply narrowing the gauge, unless the cars were also made narrow, and that the latter can be done just as easily in a 4 feet 8½ inch gauge road as in one of 3 feet.

Commenting on the discussion of this subject at the Richmond Convention, the *American Railway Times* says,

"It must not be forgotten that, as a matter of safety, and therefore of eventual economy, the strength of rolling-stock must be great enough to meet the unexpected emergencies arising from a variable traffic; and perhaps we may include the emergencies arising from disturbances in the trains, such as slight collisions, slight obstructions on the rails, a careless handling of the throttle in starting trains, and other strains incident to the railway service. A ten-ton freight-car built just strong enough to carry that amount of weight on a smooth road would not, we think, be a safe or profitable investment to the company. It is with rolling-stock as with steam-power, there must always be an overplus of it to meet emergencies; and that is what we suppose the committee mean by their report. The freight equipments of our railways have to be strong enough to meet these emergencies of variations in traffic and track disturbance; and it is equally the case in passenger equipment. Now, this safe medium of strength can not be secured without adding weight to the cars; and it is the opinion of many master mechanics that a few extra hundreds or tons of weight on a large-size passenger-car are of very little consequence, if the additional strength is secured, because the car will run with greater steadiness and with less disturbance to the superstructure, while the life of the car will be much prolonged. Every observant passenger knows that a long, heavy passenger-car runs with much greater ease of movement than does a short car; its weight gives it its steadiness of movement, and as long as the weight on each wheel does not exceed the maximum limit which experience has shown can safely be carried by the rail, we are inclined to think the extra amount of gross weight in the car itself is not of so much disadvantage in the economy of operation as has been commonly supposed."

Nothing to Do.

A contemporary under the head of "The Man with Nothing to Do," gives the following account of some of the duties of a noted railroad man:

"Some of the friends of T. A. Scott are a little solicitous lest he should be out of a situation this summer, and are engaged hunting up railroads two or three hundred miles long, to enable him to take the presidency, just to keep his hand in. This is well enough, as he is only president of five roads, including the Union Pacific, vice-president of twelve, including the Pennsylvania Central, director of thirty-three, and general consolidator of the balance. He keeps four secretaries busy looking after his iron, oil, silver, gold, quicksilver, lead, slate, steel, coal, and wild land inter-

ests; devotes a few leisure moments to steel-rail and locomotive manufactories, steam-ship lines, bridge-building and engineering; finds relaxation in running the Pennsylvania and Virginia legislatures, and finds entire repose in directing Congress, the President, and the Supreme Bench in all that relates to his claim of road throughout the land. Independent of all that, he is married. His locks are slightly sprinkled with gray, but this comes of years, not care. His face wears a sunny smile, and is as cheerful as a robin in May. It is well that his friends look after him, and time is not permitted to hang heavy on his hands."

Miscellaneous Items.

THE New-York Viaduct Railway will be built on brick arches, supported by heavy iron lateral columns, themselves supported on inverted arches of solid masonry, built into the ground. A thick bedding of earth on which the tracks will be laid, will deaden the sound of passing trains, and tend greatly to reduce the reverberation. The road will be carried on bridges over the streets, and pass through the blocks, either traversing the back-yards of houses or stores, or, when near the street, forming the roof to a series of arcade stalls fitted up as stores, markets, bazaars, or for manufacturing purposes. The main line will have four tracks, two for slow and two for fast trains. The charge will be about one cent per mile, or seven cents for the whole distance, and the running speed of the trains will be about twenty miles per hour.

MESSRS. JACKSON & SHARP, at their works in Wilmington, Del., are constructing two first-class, two second-class, and two express and baggage-cars, for the Denver and Rio Grande Railway; one passenger-car and one baggage for the Central Valley Railroad, of New-Jersey—all narrow-gauge stock.

It has lately completed two palace-cars for the Pullman Southern Car Company, will ship two more this month, and three more early in July. They are to run between Louisville and New-Orleans.

The firm has lately completed an addition, 249 feet long, to their erecting-shops, making that building 490 feet by 70, and capable of containing thirty-two cars. Early in June, the Western Union Telegraph Company connected with the office of these shops, so that it may be reached directly from all parts of the Union.

THE Philadelphia and Reading Railroad shops, recently destroyed by fire, have been rebuilt and supplied with new and improved machinery. The main structure is of stone, and is 710 feet long, 165 wide, and 65 in height. A working force of 425 men is employed. The shops turn out one passenger-car per week, and three freight-cars and four eight-wheel coal-cars per day. The passenger-car department is under the superintendence of Mr. John H. Rankin. The freight-cars are in charge of Mr. Ellis Boone, and the coal-cars of Mr. Samuel Spotts, the entire work being under the supervision of Mr. Aaron Steinbach, who has been connected with the company for the past twenty-five years.

THE Baltimore and Ohio Railroad Company turn out sixty rolled and twelve hammered axles a day from their rolling-mill and forge, and eighty car-wheels per day from their foundry at Mt. Clare.

THE Harlan and Hollingsworth Company at Wilmington, Del., is just completing some very fine Wagner drawing-room cars for the New-York and Pennsylvania line. The cars have under them the Ashbel Welch trucks.

IN an action recently tried in England against a railroad company, it was testified that experience has shown that, by tapping, defects can be detected in the wheels, but not in the axles, but that the only way to find out whether an axle is sound or not is to break it. The plan adopted is to break several specimens taken at random from a lot of axles, in order to find whether the iron is good. If the test be satisfactory, the rest of the axles are taken on trust. The breaking of railway axles very seldom occurs. In the case before the court, which was an action for damages against the railroad company, arising from injuries caused by the breaking of an axle, it was proved that this particular axle had been in use for eighteen years, and that after it broke a fracture extending around it to the depth of half an inch was discovered.

City Railroad Cars.

NEVER full; pack 'em in;
Move up, fat men; squeeze in, thin;
Trunks, valises, boxes, bundles,
Fill up gaps as on she tumbles.
Market-baskets without number,
Owners easy, nod in slumber;
Thirty seated, forty standing,
A dozen or more on either landing.
Old man lifts his signal finger,
Car slacks up, but not a linger;
He's jerked aboard by sleeve or shoulder,
Shoved inside to sweat and moulder.
Toes are trod on, hats are smashed,
Dresses soiled, hoop-skirts crashed;
Thieves are busy, bent on plunder;
Still we rattle on like thunder.
Packed together unwashed bodies,
Bathed in fumes of whisky toddies;
Tobacco, garlic, cheese, and lager-beer
Perfume the heated atmosphere.
Old boots, pipes, leather, and tan,
And, if in luck, a "soap-fat man;"
Ar'n't we jolly? What a blessing!
A horse-car hash, with such a dressing!

Facetiæ.

A RICH farmer refused to subscribe for an iron fence for a cemetery in Vermont, on the plea that it needed no fence, as those inside can not get out, and those who are out do not want to get in.

A MAN was brought into court on the charge of having stolen some ducks from a farmer. "How do you know they are your ducks?" asked the defendant's counsel. "Oh! I should know them *anywhere*," replied the farmer, who proceeded to describe their peculiarities. "Why," said the prisoner's counsel, "those ducks can't be such a rare breed—I have some very like them in my yard." "That's not unlikely, sir," said the farmer; "they are not the *only* ducks I've had stolen lately." "Call the *next* witness."

A MINISTER, traveling through the West some years ago, asked an old lady, on whom he called, what she thought of the doctrine of total depravity, "Oh!" she replied, "I think it is a good doctrine, if the people would only live up to it."

As illustrative of the intense summer heat of the Colorado country, military men at Fort Yuma used to have a tale that a soldier died there and was buried, and went to the hot place; but that one night he reappeared among his comrades, and said that it was so much colder down below than he had been accustomed to that he could not stand it, and had to come back after his blankets.

"I'M afloat! I'm afloat!" screamed a young lady of powerful lungs, and fingers to match, as she exercised both at the piano.

"I should think you were," growled an old bachelor, "judging from the squall you are raising."

A COUNTRY editor, living on the line of a railroad, applied for a pass for himself, and added, "Please embrace my wife." The superintendent returned a pass to the editor, but declined the proposed honor.

As the late Rufus Choate was attending the Italian opera one evening, with a lady, he leaned toward her with the extremest gravity, and said, "Interpret the libretto for me, my dear, lest I dilate with the wrong emotion."

"How do you like the character of St. Paul?" asked a parson of his landlady one day. "Ah! he was a good, clever old soul, I know; for he once said, you know, that we must eat what is set before us, and ask no questions for conscience' sake. I always thought I should like him for a boarder."

"I AM rejoiced, my dear wife, to see you in such good health," said Sparks to his wife. "Health?" was the quick retort; "why, I have had the plague ever since I was married."

A WESTERN representative in Congress boasts that he can "bring an argument to a p'int as quick as any other man." He can bring a quart to a pint a good deal quicker.

A MAN was recently convicted in Kentucky of stealing his neighbor's cows and hiding them in a cellar. It was a cowardly mode of *cow-hiding*.

A SPOILED child—one that played with a can of kerosene.

"SAMBO, wh't am your 'pinion ob rats?"
"Wall, I t'ink de one dat has de shortest tail will get in de hole de quickest. E'yah! e'yah! e'yah!"

A CONNECTICUT schoolboy has written a composition on the horse, in which he says it is an animal having four legs, "one at each corner."

VICTORIA receives only $1,200,000 a year; but she owns several large dairy farms, and her butter commands the highest price in the London market.

THE Comanche Indians are disgusted with the employment of colored troops on the frontier, they are so hard to scalp.

THERE are but twenty-six cubic feet of gold now used in the world. Are we not lucky to have two feet?

WHAT a difference it makes whether you put Dr. before or after a man's name.

THE more a man knows, the less he is apt to talk; discretion allays his heat, and makes him coolly deliberate what and where to speak.

Car-Wheel Manufacturers.

Atlantic Iron-Works	Portsmouth, Va.
Barnum & Richardson Manufacturing Co.	Chicago, Ill.
Barney & Smith Manufacturing Co.	Dayton, Ohio.
Bass & Hanna	Fort Wayne, Ind.
Davenport, Fairbairn & Co	Erie, Pa.
Dawson Manufacturing Co	Dawson, Ga.
Detroit Car-Wheel Works	Detroit, Mich.
Fulton Foundry Co	Cleveland, Ohio.
Gill & Bidwell	Allegheny City, Pa.
Harrisburg Car Manufacturing Co	Harrisburg, Pa.
Jackson & Woodin	Berwick, Pa.
John L. Gill	Columbus, Ohio.
Lobdell Car-Wheel Works	Wilmington, Del.
Missouri Car and Foundry Co	St. Louis, Mo.
Moore Elastic Car-Wheel Co	Jersey City, N. J.
Mowry Car and Wheel Works	Cincinnati, Ohio.
Ohio Falls Car Co	Jeffersonville, Ia.
Pettengill, Glass & Co	Cleveland, Ohio.
Ramapo Wheel & Foundry Co	Ramapo, N. Y.
Scoville, J. & N. C	Buffalo, N. Y.
Taylor Iron Works	High Bridge, N. J.
Thompson, Douglas	Bordentown, N. J.
Tredegar Company	Richmond, Va.
Washburn, Hunts & Co	Jersey City, N. J.
Wason Manufacturing Co	Springfield, Mass.
Whitney & Sons	Philadelphia, Pa.
Woodbury & Company	E. Cambr'ge, Mass.
Wyoming Valley Manufacturing Co	Wilkesbarre, Pa.

Locomotive Builders.

Baldwin Locomotive Works	Philadelphia, Pa.
Brooks Locomotive Works	Dunkirk, N. Y.
Danforth & Cooke	Paterson, N. J.
Dickson Manufacturing Co	Scranton, Pa.
Grant Locomotive Works	Paterson, N. J.
Hinckley & Williams	Boston, Mass.
Manchester Locomotive Works	Manchester, N. H.
Mason, William	Taunton, Mass.
McKay Iron and Locomotive Works	Jersey City, N. J.
Portland Company	Portland, Me.
Pittsburg Locomotive Works	Pittsburg, Pa.
Rogers Locomotive Works	Paterson, N. J.
Rhode Island Locomotive Works	Providence, R. I.
Schenectady Locomotive Works	Schenectady, N. Y.
Porter, Bell & Co. (light locomotives)	Pittsburg, Pa.
Taunton Locomotive Works	Taunton, Mass.

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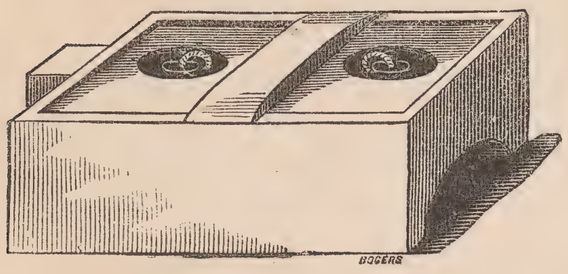

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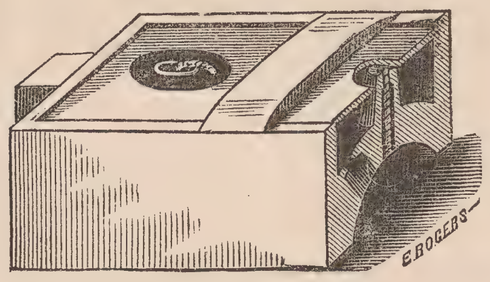

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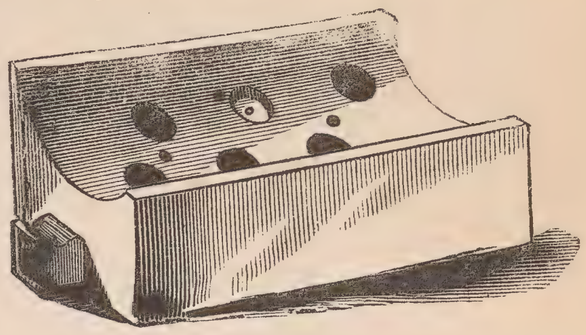

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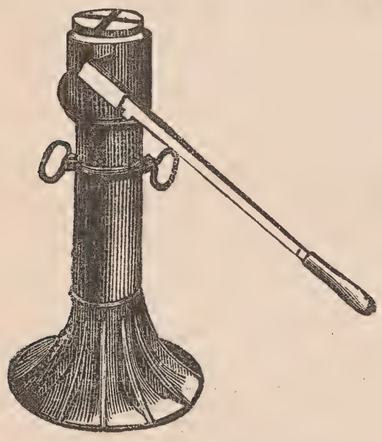

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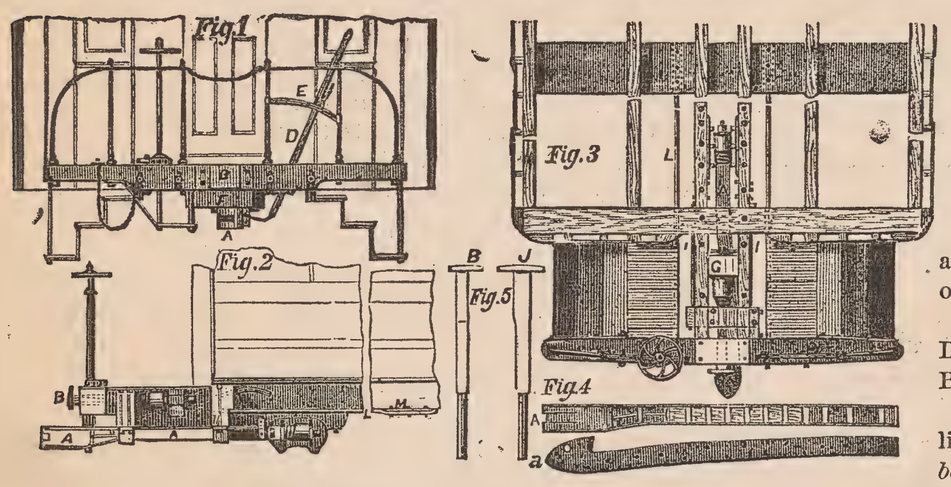

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DESCRIPTION.

Figure 1 is an elevation; Figure 2, a longitudinal section; Figure 3, a plan of an end of a car to which the arrangement has been applied; and Figures 4 and 5 show top and side views of the "Hook" and "Buffer," drawn on a larger scale than that of Figures 1, 2, and 3.

The letters refer to the same parts in all the figures. A is the coupling "Hook," B the "Buffer," C the "Stop," D the "Lever," E the "Quadrant Ratchet," F the "Truss Beam," G the "Spring Beam," H the "Suspender Beam," I the "Upward Trusses," K the "Main Spring," L the "Downward Trusses," and M the "Bolster."

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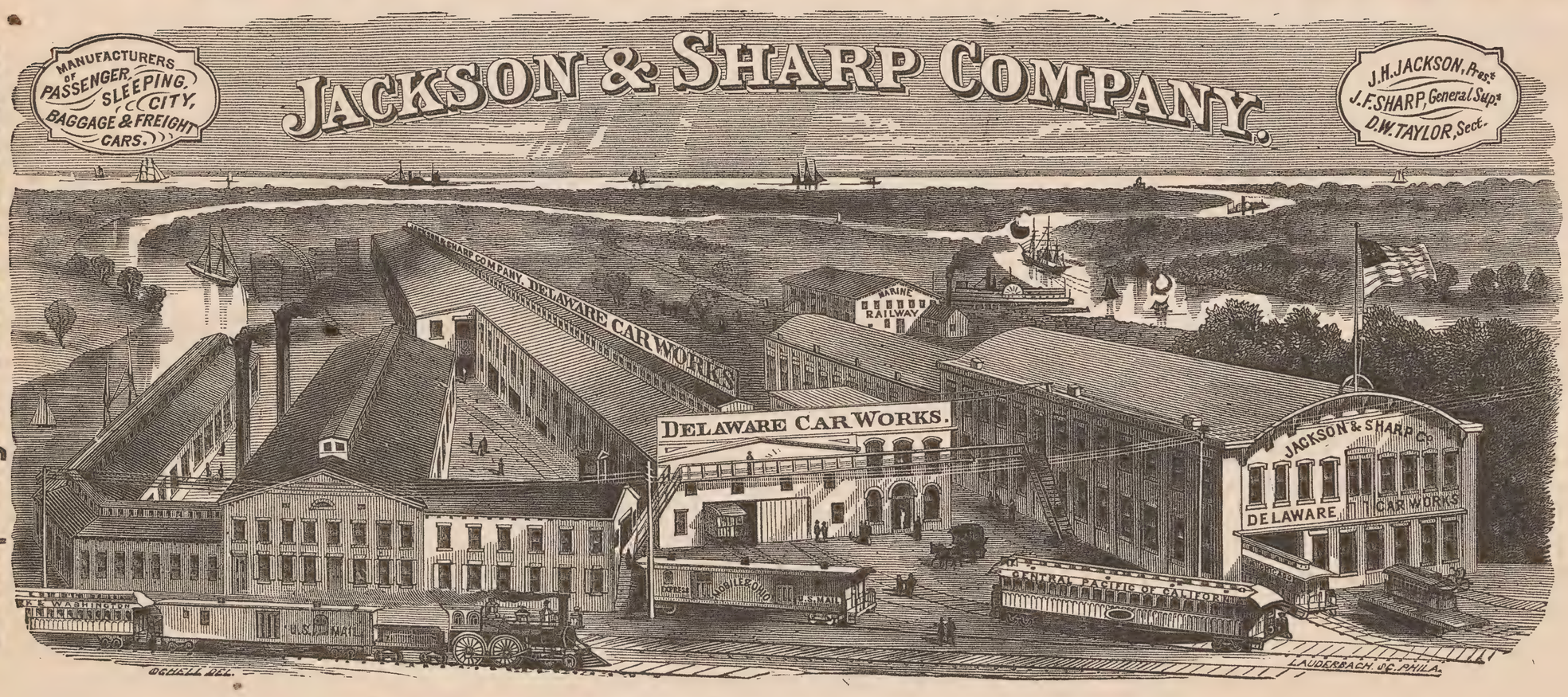

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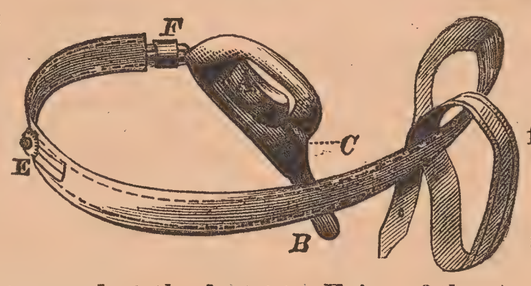
B, Perineal Clasp, for retaining Pad in position.



C, Groove for Spermatic Cord.

E, Hinge and Eccentric Wheel, for regulating pressure of the Spring.

F, Device for adjusting Pad with accuracy.

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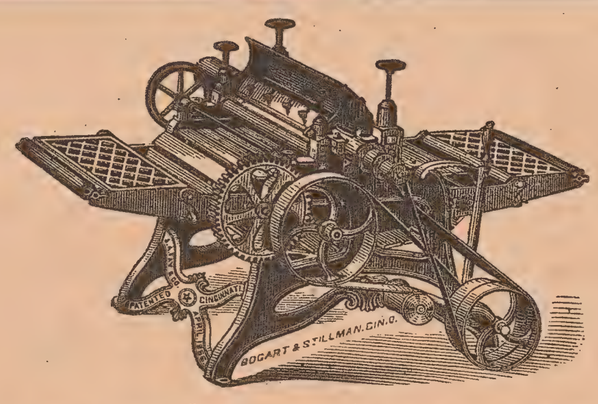

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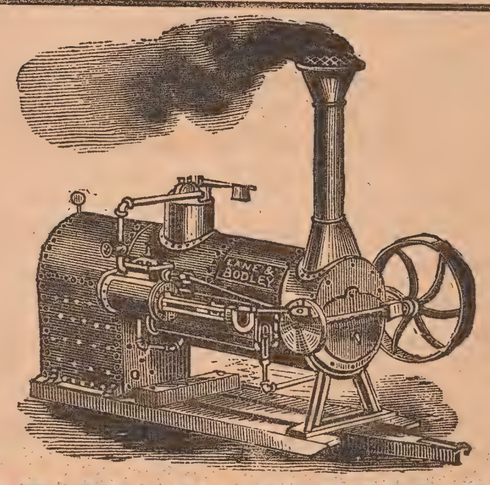

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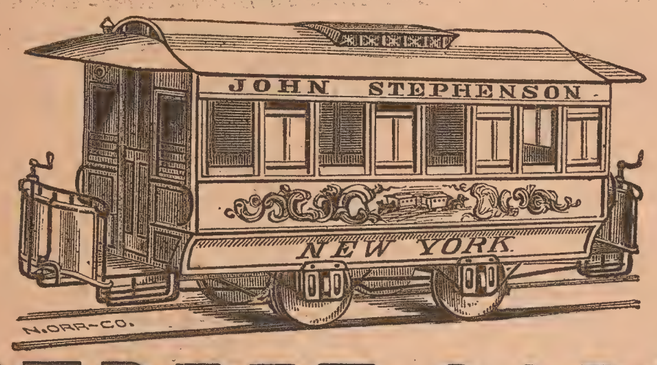

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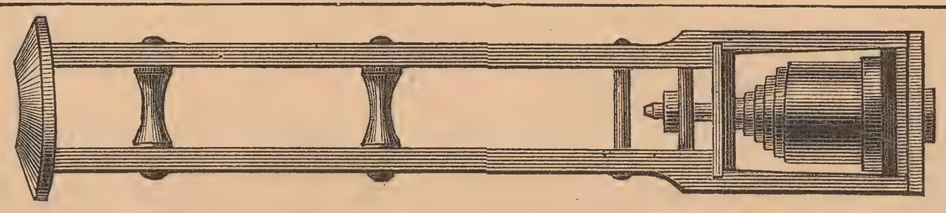

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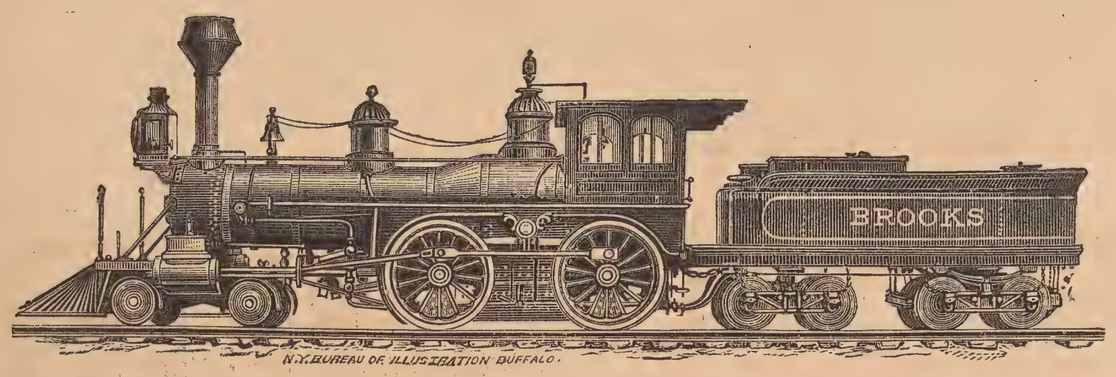

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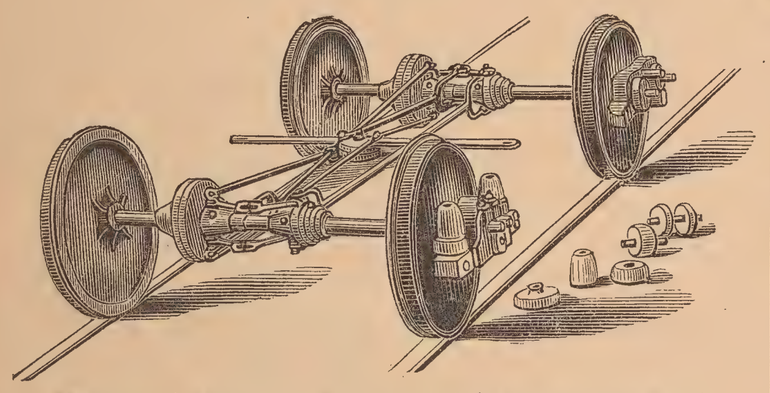

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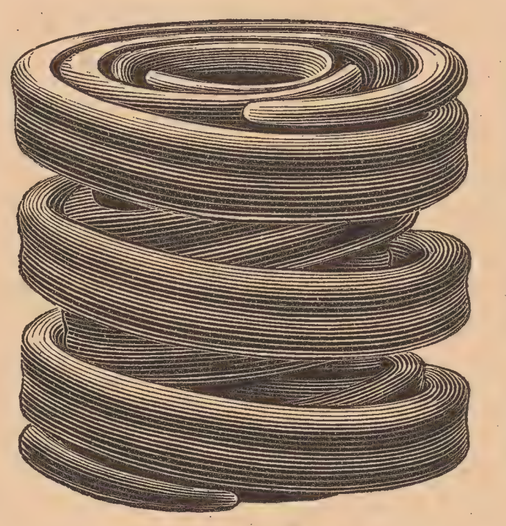

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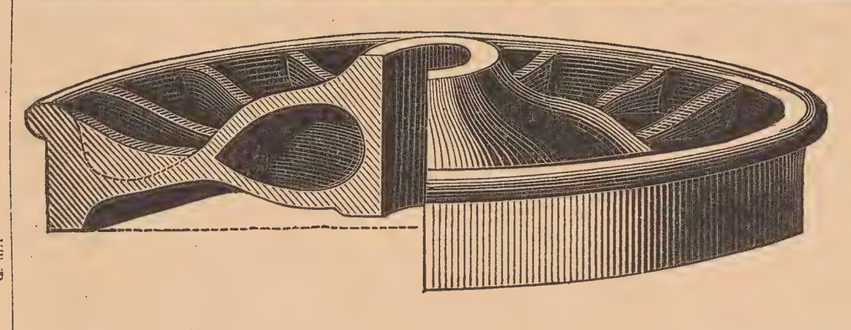

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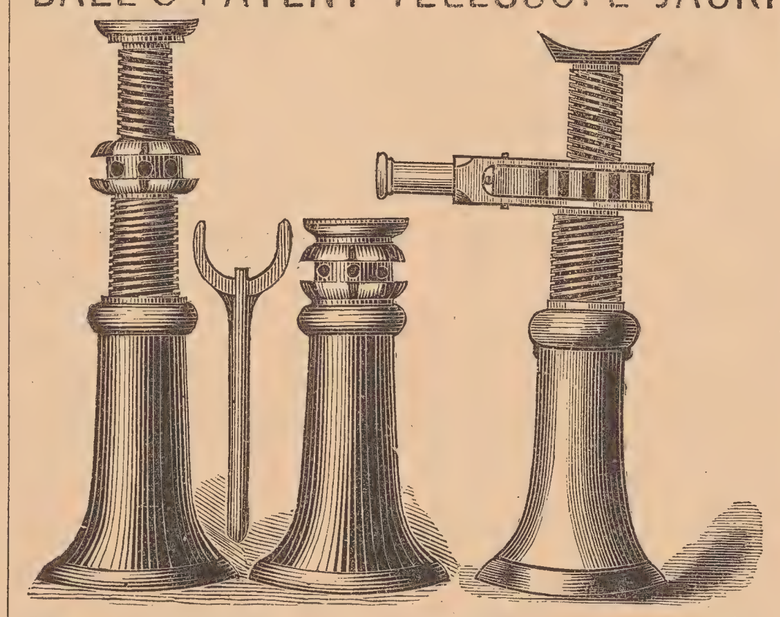

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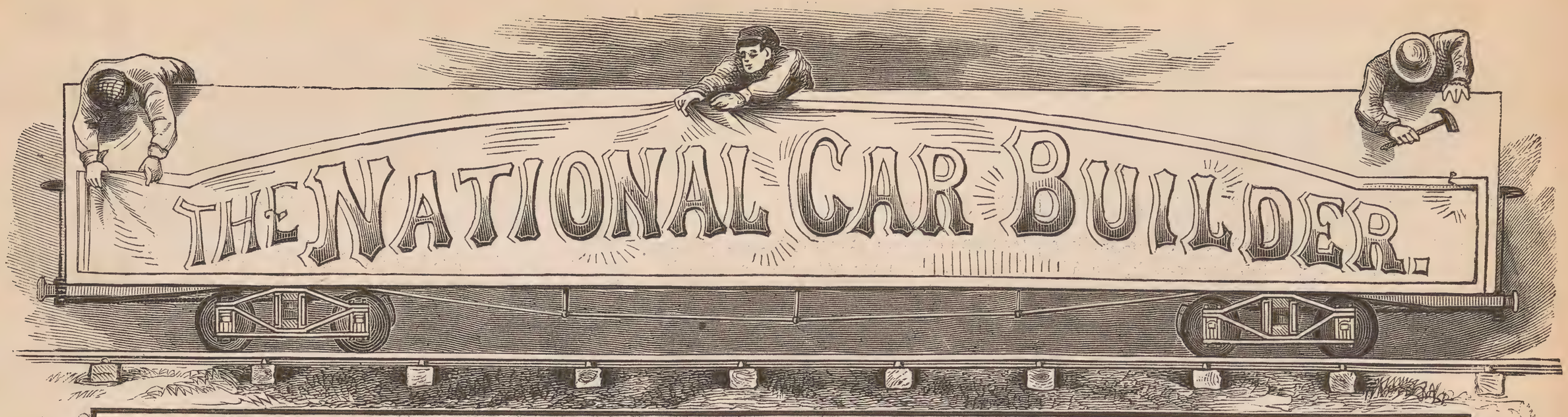

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Vol. II.
No. 3.

SEPTEMBER, 1871.

50 Cents per Annum.
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The Le Chatelier Brake.

In ordinary locomotive engines, when the valve-gear is reversed while running forward, for obtaining in an emergency the retarding effect of the full boiler pressure opposing the motion of the pistons, the reversed working can not be continued longer than a few minutes without serious injury, owing to the heating of the cylinders and the cutting of the rubbing surfaces from want of lubrication; the cylinders act as pumps in the reversed working, drawing in the heated gases from the smoke-box and forcing them into the boiler. The object of the present plan is to enable locomotives, in taking trains down inclines, to be worked continuously for any length of time with the valve-gear reversed, so as to obtain the advantage of the counter-pressure steam as a retarding power, instead of the train brakes, without involving the objection hitherto preventing the use of continuous working. In the regular working of locomotives, not reversed, the piston in its forward stroke is propelled by the full pressure of steam from the boiler, until the steam is cut off by the slide-valve, after which the propelling power is continued through the remainder of the steam expanding in the cylinder. But in the reversed working, the distribution of steam is effected by the side valve in the inverse order and on the opposite side of the piston, while the motion of the piston and driving-wheels still continues in the direction as previously. In the first portion of the stroke, therefore, the cylinder is opened to the exhaust on the front side of the piston; but in the latter portion the steam, at full boiler pressure, is admitted and opposes the forward motion of the piston. In the return stroke, the front of the piston, in ordinary working, is in communication with the exhaust until nearly the end of the stroke; but in the reversed working, it is to the back of the piston that the exhaust is open, and the piston accordingly draws in the heated gases from the smoke-box at atmospheric pressure, and in the next forward stroke the contents of the cylinder are compressed as soon as the exhaust-port closes, and forced by the piston into the boiler against the full pressure of steam. The latter portion of each stroke of the piston is thus made against the full boiler pressure, which resists the motion of the piston, and consequently acts as a powerful retarding force to check the rotation of the wheels in the direction of running.

The simple and efficient plan designed and carried out by M. Le Chatelier for counter-pressure working consists in introducing a small jet of hot water from the boiler into the base of the blast-pipe of the exhaust part of the cylinder; this jet being discharged at boiler pressure into the atmospheric pressure of the exhaust-passages, the greater portion of the water instantly flashes into steam at an atmospheric pressure, and instead of the heated gases from the smoke-box a moist vapor or fog is now drawn into the cylinders behind the piston. The rubbing surfaces are thus maintained constantly lubricated by the presence of saturated steam, and all heating or cutting is entirely prevented. The jet of water is regulated so as to be always slightly in excess of the precise quantity required, the object being to prevent the possibility of drawing in any of the heated gases from the smoke-box; and the constant escape of a slight cloud of steam from the chimney affords an indication to the driver of the sufficiency of the jet. Mixed jets of hot water and steam in various proportions have also been employed in particular cases of working. The use of the counter-pressure working has the important advantage of rendering the great weight of the engine available as brake-power; and as the amount of retarding power obtained from a counter-pressure steam against the pistons when running reversed is less than the propelling power of the steam in ordinary working, the engine wheels are not skidded upon the rails; but a steady retarding force is continuously applied to them within the limit of their adhesion. The wear of rails and tires, that is caused by the friction of the train wheels when skidded by the ordinary brakes, and the consequent injury to the wheels by wearing flat places in their circumference, are avoided to the extent that the counter-pressure steam is used as a break on the engine; and the practical working of the counter-pressure plan has been found so satisfactory, that its use has been carried so far in many cases as to supersede the employment of the train-brakes, not only in descending inclines, but also in stopping and shunting at stations. In shunting, the steam-regulator is left constantly open, and the motion of the engine is controlled entirely by the reversing handle. The employment of the counter-pressure working has now been extensively adopted in France, Spain, and other countries, as many as fourteen hundred locomotives being regularly working on this plan on the Paris and Lyons Railway alone, both in descending inclines and in stopping and shunting at stations; and in all cases its adoption has been attended with complete success.—*Railway Times.*

Denver and Rio Grande Railroad.

The published description of the country through which this important narrow-gauge road will pass states that the elevation of Denver City above tide is 5200 feet, that of Santa Fé 7100 feet, that of Chihuahua, 4368 feet, and that of the City of Mexico, 7990 feet. It is a mountain land of pine forests, broken by inclosed plains called parks, and extensive valleys of great beauty and fertility. Coal-beds crop along the eastern foot of the mountain range. The mountains themselves are rich in iron, gold, silver, lead, copper, zinc, limestone, granite, and clays. The road is intended to run from Denver City southward, along the outcrop of the coal, 100 miles past Colorado City; then enter and ascend the valley of the Arkansas River, southwestward, to Cañon City, and westward, 40 miles, to Poncho Pass. Here it resumes its southerly course; crosses the mountain divide, and gets upon the extreme head-waters of the Rio Grande in Homan's Park. This part of the line is 30 miles long. The rest of its way the road follows the Rio Grande south, for 140 miles, crossing four considerable rivers, which enter the great river from the east; the last two of these branches being the Callora and the Aroyo Honda. The course of the road now becomes S. 30 deg. W., and still along the east bank of the great river; past San Juan, 60 miles, where it has Santa Fé to the east of it, distant 15 miles, Santa Felipe, Bernalillo, Atrisco, and Pajarito, where it crosses to the west bank of the river. This point is 250 miles south of the Arkansas River. Here the line crosses at right angles the proposed line of the Atlantic and Pacific Railroad, (coming up the Canadian Fork, and the headwaters of the Rio Pecos, by Fort Butler, and Anton Chico, through the Cañon Blanco, by Albuquerque.) The railway will be completed and in running order from Denver City to Colorado City, 80 miles, this month, securing the trade of the Platte cañon, and of the mines and forests of the South Park. This secures also the Lake Pass, the only practicable crossing of the divide between the Platte and Arkansas rivers. Grading has been commenced in the Arkansas cañon, 50 miles from Colorado City, the most important entrance into the park country, and into the southern and western mining districts of Colorado. The passenger and freight traffic of the Rio Grande will be at once diverted to this new route.

Coal and Coke Cars.

Accepting an invitation from the Superintendent of the Pittsburg and McKeesport Car Company, we visited their shops for the purpose of examining one of Kirkwood & Merrington's patent coal and coke cars, just completed, and which will be on exhibition during the coming week. This is one of the most ingenious and yet simply constructed cars we have ever seen, and in appearance is indeed a beauty. But aside from the neat and compact appearance of the car, its particular advantages over all others in the way of increased capacity, distributing its load, and the arrangement for its instant discharge, makes it one of the most complete cars for the transportation of coal or coke ever offered to the trade.

Invitations will be sent to the coal men at home and along the rivers, and the fine photograph accompanying each invitation shows the peculiarities of the car so perfectly that an explanation is hardly needed to understand it. We would advise all, however, who are interested in this branch of trade, to call and examine the car next week for themselves.

We understand the company have already received extensive orders for this new patent car, of which they are the exclusive manufacturers. Parties wishing them had better send their orders in early, as their business is increasing so fast that the demand is becoming greater than their facilities for manufacture.—*McKeesport Paragon.*

Care of Machinery—Safety of Workmen.

"WHERE is your engineer?" we inquired recently of some workmen as we stood by a thumping engine and a dirty boiler with two rusty gauge-cocks. "Oh! the boy, you mean; he is playing around somewhere," was the answer. Leaving the youth to enjoy his frolic, we examined the machinery that had been consigned to his charge and watchful care. On finding that water issued from the top gauge-cock, we felt easier. We then looked for a steam-gauge, and lo! far back on the top of the boiler we descried a dingy-looking dial, upon which, with our best eye-glasses, we failed to discern any indicating pointer or figures. We then explored for the safety-valve, and found it safely covered with an accumulation of coal and sawdust, and out of the reach of both anxious inquirers and boys. But here comes the boy engineer. The fire-doors are flung open, all the fuel that can be stowed away is thrown into the furnace, bang go the doors again, and he is off to finish his game. We subsequently learned that there were three rented work-shops with machinery driven from this engine and boiler, and that the latter was second-hand when it was put on the premises. A short distance from these works we found another boy-engineer in charge, and the machinery gradually wasting away from hard knocks, cold, neglect, and old age. "Why does not your landlord employ a competent and careful engineer who would keep his machinery in repair?" we again asked; and smilingly added, "You would feel safer if he did." "Oh! he says he can not afford it," was the answer. Here, then, were second-hand boilers, boy-engineers, machinery out of repair—all tolerated on the plea of want of means. It is no wonder that the workmen in those buildings scold the boys, but despise the landlords who cause their lives to be put in jeopardy ten hours every day. These are not "fancy sketches," but the state of things as they actually exist in the instances described; and we too frequently find the same condition of things in all parts of the country. The condition of machinery in many of our manufactories is disgraceful, not to say dangerous. We write this from no hearsay; we know it from daily personal observation. Owners of machinery, in nine cases out of ten, pay high prices for their power; but when they have got their machinery in running order, they seldom employ a competent engineer, but get some raw hand or "smart boy" who thinks he can "fire and run an engine." They claim that neither their profits nor their business will allow them to pay high wages for running the machinery; but after a few accidents, for which they pay handsomely, they learn the economy of keeping their mechanism in repair, and employing reliable and competent persons to run their engines. We maintain that it is as much a duty of a manufacturer to examine or to have examined daily the state of his machinery, from boiler to journal, as it is to inspect and examine his wares. Are not lives as valuable as property? Is not the health of an employee of as much consequence as a bale of goods? And yet we see dirty and greasy floors in the engine-room; the examination of the safety-valve often requires the use of a lamp; pipes leak steam and water; bearings are without drip-pans; belts are without guards, and occasionally send a patient to the hospital; steam-pipes are rusty for want of paint; rooms are hot and poorly ventilated; the machinery is crowded; the passages are narrow; windows are unwashed; light is limited; grease and dirt are plentiful, and noise from unrepaired machinery adds to the general discomfort. We charge the whole of such neglect and carelessness on proprietors, because, if they would employ intelligent and competent assistants who understood their business, and took a pride in the care and appearance of machinery, there would be a vast difference in the general neatness and good appearance of the works. In addition to this, a salutary influence would soon be observed in the health, conduct, and feelings of the employees. We could enlarge upon the advantages which would result from manufacturers enforcing thorough cleanliness, constant watchfulness, frequent examination, and immediate reports of all and every thing that gets to be dangerous about their machinery, or that requires repair; but the good results accruing from such regulations are apparent to every mind. We close by simply remarking that, in instances where investigation thorough and complete takes place, and where machinery receives the attention it demands, there we notice an amount of satisfaction and honorable pride on the part of both employer and employees.—*Technologist.*

The First Locomotive-Works in America.

Scribner's Monthly for July, in describing Philadelphia and its industries, gives the following account of Baldwin's Locomotive-Works:

"The Baldwin Locomotive-Works on Broad street have a national reputation. Founded in 1831, they have grown to colossal proportions, and employ 1800 men. It takes 1800 men one day to complete, set up, and make ready for service a single locomotive. Thus these works could turn out 300 engines a year; in fact, in twelve months, ending last October, they actually sent off 267, which, one after another, went dashing over the country. Although Mr. Baldwin, the founder, is dead, the works still bear his name, for they are the creation of his inventive genius and indomitable perseverance.

"Previous to the spring of 1831, only two locomotives had been built in this country, and those at the national foundry of West-Point. In that spring, Mr. Baldwin made a miniature engine, with two cars, capable of seating four persons, and placed it on a track laid in Peale's Museum, where it was surrounded by curious crowds. The next year he received an order from the Germantown Railroad Company for the construction of a locomotive for their road. Although but a single American mechanic had succeeded in building one of any use, he boldly undertook it. At the time, there was not a blacksmith in the city that could weld a bar of iron more than an inch and a quarter thick, and no one thought of attempting to weld a tire five inches wide and an inch and a half thick. The only machine for boring out a cylinder was a chisel fastened in the end of a stick, to which a crank was fitted and turned by hand. He had no proper tools, no patterns, no models; but, confidently relying on his genius and resolution, he went to work, and in six months had it finished and placed on the road. Crowds gathered along the line to see this self-moving monster drag a train of cars after it. It was a great success. Soon after, there appeared in the city papers the following notice:

"'NOTICE.—The engine (built by Mr. Baldwin) with a train of cars will run daily (commencing this day) when the weather is fair. . . When the weather is not fair, the horses will draw the cars the four trips.'"

"It is not yet forty years since this extraordinary notice appeared in the press of a city into which, now, a dozen railroads run, along which dozens of locomotives thunder.

"It is singular how the simplest contrivances are often overlooked, while those requiring the most consummate skill are wrought out. Here was a man who could, almost without tools, from his own ingenious brain construct a locomotive, and yet the simple remedy of a 'sand-box,' to keep the wheels from slipping, never occurred to him. The principle he doubtless had seen applied a score of times to keep the human foot from slipping on the ice, but he never thought of adapting it to this case; and so, in wet weather, the locomotive was stabled and the horses turned out, and *vice versâ* in fair weather.

"From that time the reputation of the works was established, until now it is doubtful if they have their equal in the world. A stroll through them awakens novel and often sublime emotions. Amid the din and clatter and thunder of machinery and ponderous hammers, the law of order is seen to prevail over all. Each part is made in a separate building or room; and one sees only a pile of rivets here, boilers there, heaps of smoke-stacks, and a confused collection of wheels and tires that resemble chaos. But at a given word these detached bones of the monster move from diverse points to a common centre—the erecting-shop—each to find its appropriate place in the body that is to be formed. As part is fitted to part, every thing is found adapted accurately to that which it is to join, and rapidly the ponderous thing takes form and swells into huge proportions. When completed, men take hold of the drivers and roll them once or twice backward and forward, to see that all is clear. Steam is then turned on, and the drivers are sent whirling at a speed that would carry a train thirty miles an hour. Then the inspector advances, and, like a skillful doctor when he examines a patient, lays his hand on the pulse of the engine. The fingers now press the piston-rod, and now the connecting-arms, drivers, and cylinder-heads, to see if there be any jar or disturbance. If there is none, the engine is declared fit for use, and is lowered down upon the rails and rolled out by the side of the railroad, ready to be sent to its point of destination."

Testing Lubricating Oils.

IN an editorial upon this subject, the *National Oil Journal* remarks, "Some practical and inexpensive method of testing the quality and relative value of different kinds of lubricating oils, is a standing want on the part of large oil consumers."

We know that some of our best railway managers comprehend the importance of this matter, and are anxious that some method should be devised which will secure them against the contingencies we have indicated. The Great Western Railway Company of Canada is the only one, so far as we are aware, that has undertaken a practical solution of the question. At their machine-shop, in the city of Hamilton, they have erected a very simple yet thoroughly practical machine for the purpose of testing lubricating oils. It consists of an ordinary car-axle arranged to run in ordinary journal-boxes. The axle is run by belts from a stationary engine at a uniform rate of speed, and under a pressure of $2\frac{1}{2}$ tons to each journal—equivalent to ten tons to a car. The packing and all the other conditions of the test are made to correspond as nearly as possible to those of a car in motion on the road. A thermometer is so arranged as to indicate the exact temperature, and during a trial all the conditions of the test are recorded in what is called the test-book. No oils are purchased nor allowed to be put on the road without being first tested by this machine.

It may not be inappropriate to give in this connection a brief description of a machine for a similar purpose, but of more elaborate construction, built a few years ago by the authorities at the Brooklyn Navy-Yard. In this case, the tests were designed to be analogous to the requirements for the main bearings of screw steamers. For this purpose, a shaft with journals nine inches in diameter was fitted to revolve in appropriate brasses. The upper brasses, instead of being secured by the usual caps, were weighted by a system of levers so arranged that the pressure could be graduated at pleasure and accurately measured. By running at a uniform rate of speed, with a counter attached to each shaft and a thermometer in each one of the upper brasses, they were able to keep an exact record of all the conditions of the tests. In operating the machine, the pressure on the journals was gradually increased until the maximum that could be sustained without increasing the temperature above 116° Fahrenheit was ascertained. This maximum pressure, other conditions being equal, was taken as an index of the relative merits of the oils tested. It was found that by applying winter sperm-oil at the rate of one half-gallon in 25 hours, the journals would just stand a pressure of 9400 pounds without increasing the temperature. Under the same conditions, summer

sperm was reported as standing a pressure of 11,164 pounds, and lard 8000 pounds. The best grades of petroleum lubricators stood from 8000 to 9000, while the various inferior mixtures and compounds were represented by greatly reduced figures. It appears that the operators conducted all their experiments with uniform quantity of oil and a graduated pressure. We think they would have rendered their report far more valuable if they had varied the test, and added a table of results in running with a uniform pressure, and the quantity of oil graduated to the apparent requirements of the journals. A purchasing agent, with a machine of this kind adapted to this use, would be able not only to guard against annoyance and damage from inferior goods, but would be able to determine with far greater accuracy than at present the relative value of the different grades of lubricators in the market. He could go to work intelligently to find the true economic mean between high and low-priced oils, and could determine for himself the quality and cost of oil adapted to his use. The Brooklyn machine complete costs but $412. We presume that one possessing all its advantages and adapted to railway purposes might be constructed for nearly or quite half the money. But, in our opinion, they would be cheap at double or three times that sum, provided they could not be obtained for less. Will not some one possessed with a spirit of invention go to work and construct, and put on the market, a portable machine which will meet all the requirements of the case?—*Scientific American.*

A National System for Time on Railroads.

The confusion experienced by the traveling public in respect to time is so great that any thing like a practical system in this direction must be received with favor. Mr. C. F. Dowd, of Saratoga, N. Y., has devised such a system, which he calls "a national system of time for railroads." It is based upon national longitude. It adopts Washington time for the eastern portion of the country as standard time; one hour slower than Washington time for the Mississippi Valley; two hours slower for the Rocky Mountain section, and three hours slower for the Pacific States. These standards are designated by the small figures 0, 1, 2, 3, respectively placed in a little elevated position before the names of the stations. Then, to designate the minute difference between the local time of any station and railroad time or standard time, small figures are placed in a little elevated position after the names of the stations. These figures, when they indicate that railroad time is too fast, have a sign, +, before them, and the sign, —, when they indicate railroad time too slow. The whole system is very simple, and if adopted would very soon be understood by the traveling public. If adopted, the traveler could keep his own time wherever he might go, and take the cars by his own watch as well in one part of the country as in another.

The Danforth Locomotive and Machine Company build cotton and other kinds of machinery, as well as locomotives, The foundation of this business was laid in 1800, by the starting of a small machine-shop, and it was probably the first machine-shop in New-Jersey. A reputation gained at that time was followed through the several changes, getting for them large orders in 1826 to 1830, and often for their improved cotton machinery. In 1852, the building of locomotives was commenced, and has been continued since. This company have built $200,000 worth of cotton machinery and 72 locomotives within a year, and have now orders for a large amount of cotton machinery for Mexico, and several locomotives for Southern railroads. Some 700 men are employed, and the works now cover more than three acres of ground.

Adjustable Car-Axles.

A diversity of one, two, or more inches in the gauge of connecting roads of course involves the necessity of breaking bulk, an annoying and expensive operation not unattended with profitless delay. To obviate this, the most obvious means consists in so constructing the truck-axles of the cars that the wheels may be readily adjusted at different distances apart. This plan is, we understand, about to be put in operation in Russia on an extensive scale, the object being, it is stated, to enable Russian trains, fitted for their broad gauge, to be run on the narrower gauge of other parts of Europe in case of any "military necessity" therefor. Where, as in this country, there are lines of different gauge, there is no need of any other than purely commercial reasons for adopting a measure which among the Muscovites may savor of shrewdness and forecast from quite another point of view. We see, however, a paragraph floating in our exchanges to the effect that the adjustable axles are to be given up, after recent trial, and their place taken by trucks of definite gauge capable of replacement on change of gauge, especially adapted to the new width. There may have been some defect in the devices whereby, in the tested plans, the fixing of the adjustable wheels to the axle was not as permanent and secure as the exigencies of the case demand; but such security is perfectly within reach by the exercise of skill and judgment; and the adjustable axle certainly affords a much more feasible, cheap, and, in the end, efficient means of accommodating cars to change of gauge than the clumsy resource of interchangeable trucks. If the adjustable axles are not yet what they should be, let them be made so; but the system, properly applied, has too much utility in it to be profitably thrown away.—*American Artisan.*

Narrow-Gauge Railways.

This subject appears to be "nuts," not only to the engineering publications of the period, but to the dailies and weeklies devoted to matters and things in general. What is said to-day we find repeated to-morrow, and the next day new changes are rung on the same old tune. So far as we can see, nothing new upon the subject has been advanced in six months, and really, the discussion is becoming monotonous.

That nothing new is said is not surprising, as, in fact, there is nothing new to say. The financial results of some of these roads are good and encouraging, and the example set by the Festinoig Railway, in Wales, is being followed with greater or less success in other parts of the world; that is about the sum and substance; yet many of our contemporaries persist in treating the matter as a grave engineering question, to be debated *ad libitum, ad nauseam,* instead of a thing settled and foregone. No one at all posted in engineering progress can fail to see that the narrow gauges are just the thing needed in certain localities, and under particular circumstances, and that they are to be extensively used in the future.

Narrow-gauge railways are, however, not a new idea. They have been used in coal-mines, in excavating works, etc., for a long time, and their practicability for passenger traffic, as well as for freight, has been fully demonstrated for two years.

The question of financial policy is one which must be decided for individual cases. There are no general grounds upon which it can be elaborately discussed, and one may read column after column of much that has been written about it without obtaining a single new idea. We submit that the papers interested in the construction of railways for their own localities may properly discuss the propriety of adopting a particular gauge for their proposed roads; but the endless reiteration indulged in by technical journals upon this threadbare topic is becoming flat and unprofitable.—*Scientific American.*

Old and Modern Furniture.

In no respect has there been so signal an improvement in modern times as in the ordinary domestic furniture. The artisan now enjoys luxuries of this kind which were but three centuries ago beyond the reach of the crowned head. Heavy tables formed of planks laid upon trestles, massy oak benches or stools for seats, and floors covered with straw, formed the accommodation which satisfied the princes and prelates of our early history. Even in the time of Elizabeth, the comfort of a carpet was seldom felt, and the luxury of a fork wholly unknown.

But though the balance in point of comfort is infinitely in favor of modern upholstery, on the other hand the splendor of our hangings and bed furniture is far inferior to that of the earlier periods. Carved and inlaid bedsteads, with hangings of cloth of gold, embroidered with heraldic badges; blue velvet powdered with silver lions; black satin, with gold roses and escutcheons of arms; tapestry of cloths of gold and silver for hangings on the walls—these are pomps and vanities occurring in every page of the elder time, and no doubt their effect must have exceeded in magnificence any thing we see or hear of in the present day.

Although there are no models for our imitation in the furniture of an early English house, yet in the age of Elizabeth and her immediate successors we meet with a highly rich and elegant style of movables, capable of easy adaptation to all the luxurious wants of our most fastidious Sybarites. The couches and settees of carved and twisted ebony, the velvet and damask cushions piled upon one another like our ottomans, the canopied hangings, the ebony and ivory, or inlaid cabinets, elaborately carved oaken buffets, tables spread with velvet or damask, the great folding screen covered with figured cloths, or stamped leather, or needle-work, and the embossed andirons—these are admissible in the present day; and the elegance of no modern boudoir would be disparaged or its comforts diminished by their introduction. And though there may appear some anachronism in the application of furniture of the style of the sixteenth century to buildings of the thirteenth or fourteenth, yet this is fairly excusable of such perishable articles, and the associations connected with the one harmonize sufficiently with the other. Such a style of furniture is, at all events, infinitely more appropriate than some of our modern upholstery. What a disagreeable rebuff have our highly-wrought feelings sometimes experienced when, on entering the arched porch of a Gothic residence, we have found ourselves in a room fitted up in all the flimsy frippery of a cheap hotel, with marble chimney-pieces, spindle-shanked walnut chairs, Grecian sofas, Italian cornices, and French chiffonniers!

We are, however, pleased to be able to trace a growing improvement in the taste of the furniture of our living apartments, and a predilection for rich and elegant designs. Already there is a great and constant demand for carved cabinets, scrolled chairs, tapestried hangings, and velvet cushions. France and Germany are ransacked for these articles in order to give to our mansions their appropriate internal fashion of attire. Our upholsterers (or rather, we beg their pardon, *decorators*) are now imitating the festooned canopies of Queen Bess; and many a carver is employed in framing seats after the model of the "great Turkey leather elbow-chair, with the tapestried cushions," which accommodated the person of his "most sacred majesty" at the castle of Tillietudlem. In short, though the *wisdom* of our ancestors is rapidly growing out of fashion, it is some consolation that we are becoming daily more and more alive to the correctness of their *taste.—Cabinet-Maker.*

The first rail on the Denver and Rio Grande Railroad was laid on the 28th of July. Rolling-stock and iron enough have been received to complete one hundred miles of the road.

Narrow-Gauge Passenger Locomotive.

THE Chicago *Railroad Gazette* contains the following description of a three-foot-gauge passenger locomotive, just completed by the Baldwin Locomotive-Works for the Denver and Rio Grande Railway:

"This locomotive, with two others for freight service, has just been completed at the Baldwin Locomotive-Works, and by the time this meets the public eye will undoubtedly be at work on the pioneer narrow-gauge line in the United States. As this machine is entitled to the designation of the first narrow-gauge passenger locomotive built or operated in this country, a brief description of it will be of interest both to the railroad and general public.

"Its dimensions are as follows:

Cylinders	9 inches diameter.
Stroke of piston	16 inches.
Diameter of driving-wheels	40 "
" " pony-wheels	24 "
Distance between centre of pony-wheels and centre of front drivers	5 feet 8½ inches.
Distance between driving-wheel centres	6 feet 3 inches.
Total wheel-base of engine	11 feet 11½ inches.
Rigid wheel-base (distance between driving-wheel centres)	6 feet 3 inches.
Capacity of tender	500 gallons.
Diameter of tender-wheels	24 inches.
Distance between centres of tender-wheels	6 feet.
Total wheel-base of engine and tender	26 feet 5½ inches.
Length of engine and tender over all	35 feet 4 inches.
Weight of tender empty	5500 pounds.
Weight of engine in working order	25,300 "
" " " on drivers	20,500 "
" " " on each pair of drivers	10,250 "
" " " on pony-wheels	4800 "
Height of smoke-stack above rail	9 feet 9 inches.
Height of cab from foot-board to centre of ceiling	6 feet 3 inches.

"It will be seen that the rigid wheel-base is given as 6 feet 3 inches, the distance between centres of driving-wheels. This is due to the fact that the leading or pony-wheels are fitted with a swing bolster and radius bar, allowing them to move laterally under the engine in passing curves. These wheels are also equalized with the front pair of drivers. By this arrangement, while the pony-truck assists in guiding the engine on a curve, and so relieves the front pair of drivers from the excessive wear of tires which would otherwise result, the rigid wheel-base is reduced so that the engine will pass curves of very short radii without difficulty. It is, in fact, only about two thirds that of the four-wheeled cars designed and built for the same road.

"As much interest attaches to the subject of the speed practicable on narrow-gauge roads, we may remark that the proportions of this machine are such that it develops the same total travel of piston in going one mile as does a locomotive having 24 inches stroke of piston and driving-wheels 5 feet in diameter. It is therefore apparent that equal, or nearly equal, speeds are possible with this engine as with the engine of the usual pattern on the full gauge, that is, 24 inches stroke and 5-foot drivers.

"The plan of this engine gives somewhat more than four fifths of the whole weight on the drivers, so utilizing it for adhesion. Its tractive power on a good rail, exclusive of the resistance of curves, is as follows:

On a level	512 gross tons.
" a grade of 40 feet to the mile	164 " "
" " " " 80 " " " "	98 " "

"From these figures should be deducted 17 gross tons, the weight of the engine and tender in working order, to get the total weight of cars and lading which can be drawn on a level or on the grades named.

"The freight locomotives built for the same road have three pairs of drivers and a swing-bolster pony-truck. Their cylinders are 11 inches diameter and 16 inches stroke; drivers, 36 inches. The total weight of engine in working order is 33,500 pounds, of which about 29,000 pounds are on the drivers. Being distributed to three pairs of wheels, the weight on each pair of drivers is a little less than 10,000 pounds, nearly the same result as with the passenger engine."

How to Become Bankrupt by Manufacturing.

NOT a few, adopting the maxims we are about to promulgate as rules for conducting a manufacturing business, have succeeded in being conspicuously unsuccessful. If any others wish to follow in their illustrious footsteps, let them adhere strictly to the advice we shall give, and we will guarantee the desired result.

Let them branch off into many kinds of manufacturing, or, if manufacturing any particular class of goods, confine themselves as closely as possible to making as many different varieties of wares as the class will permit of. The first is a better and more rapid road to ruin, but the latter will do, provided that—

They so keep their books that they can not tell how much or little they are making or losing upon each variety of articles they produce, or whether there is either profit or loss on their entire business except when the annual balance-sheet is made up. We have known persons who were so foolish as to employ skilled book-keepers to keep them informed as to the state of their liabilities and assets. It is rare that such men fail so conspicuously as to acquire public fame. Their example should be avoided by those ambitious to become noted bankrupts.

Let those who wish to fail, also hire as much by the day or week as possible, and eschew the system of "piece-work." It is astonishing how much this will grease the wheels of financial disaster, especially if—

They leave every thing in charge of a salaried superintendent, not above having his favorites among the employees, who become favorites by seeing that he does not want for a gold watch at Christmas, or cigars to regale himself with during the rest of the year.

Finally, having got things in this way well in train, be sure and take no care of remnants. Let them take care of themselves. To become a bankrupt, one must not respect economy. Economy has stood between many a man and the debtor's prison or the almshouse. Therefore, have nothing to do with it. Let scraps rot and material run to waste. Spend as much time as you can with fast horses, in shooting, fishing, etc., leaving business to the superintendent. When a pinch comes, borrow money, having full faith that it will be easy to pay it when due. So shall you find smooth sailing and fair breezes to waft you swiftly to a port where you will find no lack of congenial society.—*Scientific American.*

Simplicity in Design.

NEXT to good fitting, there is nothing which tends so much to the good repute of a mechanic and his products as persistency in some simple form or style in the finish and ornamentation of his work. If the work be a machine, all of the visible shaft, bolt, stud, and nut-endings should be turned or milled carefully to the same general shape or form. There is nothing so neat and appropriate as the simple reverse curve style, free from corner or bead. Inward corners should always be avoided. There is nothing so discouraging in machine-cleaning as complicated beadings, or in house-cleaning as complex mouldings; they are only dirt-catchers, void of beauty. It is no light task to keep a complex machine like the railway engine clean and tidy; the finish and ornamentation of such machines should, by all means, be made as simple as possible. Neatness and utility should be the only objects in their construction, and all elaboration in the way of show should be avoided. The propriety of using so much brass in the external finish of locomotives has been questioned; it tarnishes so easily that an almost continual rubbing is necessary to keep it bright, imposing a tremendous tax on patience and muscle. Paint and varnish judiciously applied occasionally, especially to all the large surfaces, such as cylinder and steam-chest casings, would be far more neat, economical, and satisfactory.—*Ex.*

Petroleum for Locomotives.

A FRENCH inventor proposes the use of petroleum for locomotives, and recently exhibited a model of a small engine heated by this means, for which complete success is claimed. This locomotive carries two thousand litres, or about five hundred gallons of oil, in the tender, a hand-pump forcing the oil into a small reservoir near the boiler. The process of lighting the oil is said to be neither difficult nor dangerous, owing to the oil being kept in compartments, a small quantity only being lighted at one time, then another division, and so on, until the whole furnace is alight. This engine consumes its own smoke perfectly, and it is said to be extremely easy to drive, on account of the simplicity of the apparatus. A larger locomotive, with slight improvements, has since been built, and successful trials made of its working qualities. The consumption of oil was thirty-five per cent less by weight than that of good patent compressed coal.

Superb Passenger-Cars.

WE copy from an exchange the following description of some drawing-room cars recently built by the Harlan & Hollingsworth Company of Wilmington, Delaware, for the North-Pennsylvania Railroad:

"The through travel to Niagara Falls and points in New-York State, by way of the North-Pennsylvania Railroad, has increased to such an enormous extent that the company has been compelled to provide greater accommodations for the traveling public. It has, therefore, built several drawing-room cars for its through travel; and we venture to say that they are as superb pieces of workmanship of their peculiar kind as can be found upon any railroad in the United States. Each car contains five compartments, three in one end and two in the other. The largest of these has luxurious seats for six persons; two others accommodate four persons each, and the smallest one has room for two persons. The middle of the car contains a grand saloon, at the sides of which, by the windows, are revolving chairs, of the most comfortable description. In one end of the car is a wash-room for gentlemen, with fixed washstand, running water, and every imaginable convenience. There is also a baggage-room and water-closet, and a patent heater, which warms the car nicely in cold weather. At the other end there is a large and elegantly furnished room for ladies. The car is fitted up in the most superb manner throughout. There is nothing gaudy or tawdry about the ornamentation, but it is tasteful, elegant, and very elaborate, the furniture and carpets particularly being worthy of praise, as well as the splendid workmanship displayed in the wood-work and general decorations. All of these cars are furnished with patent springs, which make jolting impossible, and the traveler may sit at ease in his state-room or in one of the cushioned chairs of the saloon and have as much bodily comfort, while he is enjoying the gorgeous scenery along this route, as if he were in the parlor of the best hotel in the country. One of these cars will be attached to every train that leaves the depot daily at 7.35 A.M., and lands the passenger at Niagara Falls the same evening in time for supper."

THE Rogers Locomotive-Works have been in existence for more than half a century, and are under the superintendence of Mr. Hudson, who is a man of great mechanical skill. At present a force of 900 men is employed, and for the last few years from 120 to 150 engines have been built annually. Nearly 100 of these engines are now running on the Illinois Central Railroad. Mr. Hudson makes a patent grate for all these engines, by which clinkers can be removed without interruption in the supply of steam. A very large freight-engine, with three wheels coupled, was lately sent to Peru, in South-America.

Fig. 1

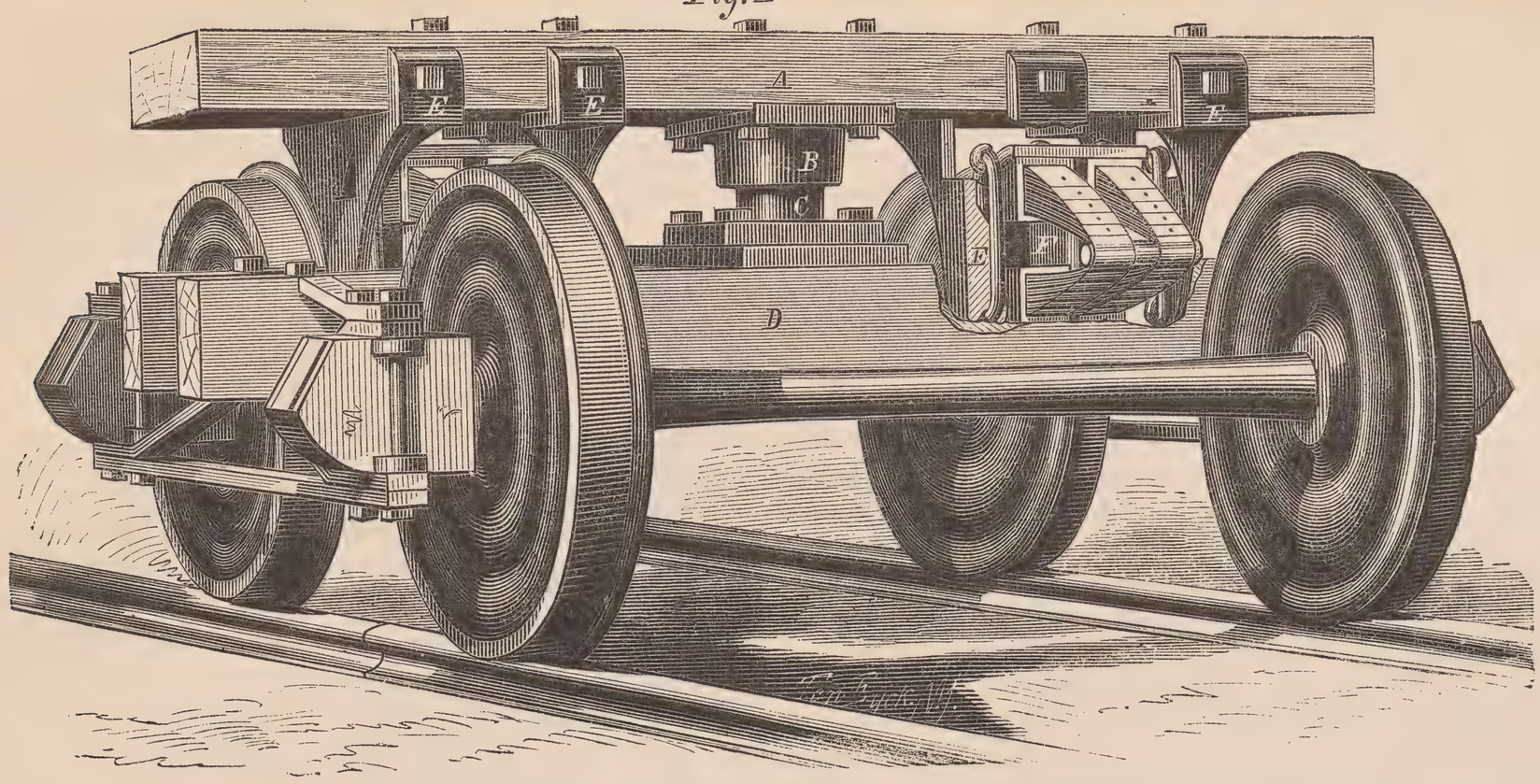


Fig. 2

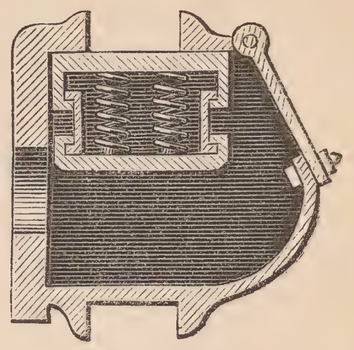
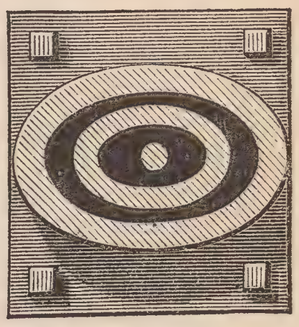


Fig. 3



WILSON'S ANTI-FRICTION LATERAL MOTION LOCK-TRUCK.

Wilson's Lock-Truck.

THIS invention does away with the whole category of friction-wheels, plates, rollers, swinging bolsters, heretofore employed in various combinations to allow the car to adapt itself without strain to the curvatures of the track. With all such devices, or any combination of them, the tendency to spread the track when the truck and car pass curves has never been completely obviated. The rolling-stock, as well as the permanent way, have suffered from this defect, which the inventor of this truck claims he has entirely overcome, securing at the same time greater simplicity of construction, and consequently diminished friction.

In this truck, the car-bolster is suspended by swinging links in suitable brackets upon elliptical steel springs, attached to the car-bolster as hereinafter to be described. By this arrangement, the bolster may have a gentle radial as well as a slight lateral motion, so that easy adaptation to curves and avoidance of strain and unnecessary friction between permanent way and rolling-stock are secured.

A novel form of crown-plate is also employed to facilitate lateral play of the car-bolster, and a certain device within the axle-box placed there to counteract the jar which is caused by the unevenness of the track, which device will be more fully described further on.

Fig. 1 is a perspective view of a four-wheeled freight-car truck. A is the car-bolster; B, the upper or female crown-plate; and C, the lower or male crown-plate. D is the frame of the truck; a portion being broken away to show fully the nature of the devices by which the car-bolster is suspended. The brackets E may be made of cast-iron, and the method of applying the links between them and the springs is so plainly shown in the engraving that further description of this portion of the invention is needless. The springs are let into the frame D, and are kept from lateral motion by stout guide-plates F, rising vertically from the frame between each pair.

Fig. 2 shows the device in the axle-box above alluded to, the object of which is to counteract the jar from unevennesses in the road. It consists of spiral springs placed over the brass bearings in the axle-boxes and secured between the bearing-plates of the axle-journals and upper seat-plates by means of flanged side-plates, whose edges are turned over to engage with the folded or turned edges of flanges projecting from the bearing-plate and seat-plate. The figure shows this part of the device very clearly.

Fig. 3 is a transverse section through the male and female crown-plates. It will be seen that they are oval in form instead of being cylindrical, like the crown-plates of ordinary car-trucks. This allows lateral play or motion of the truck in the line of the axles.

The first thing that will attract the attention of practical men in regard to this truck is its extreme simplicity—the *sine quâ non* in a good car-truck. The principle of construction may be equally well applied to six-wheeled trucks or to four-wheeled freight-trucks.

Security from sliding, should cars get off the track, and consequent precipitation down embankments, is secured by limiting the radial motion of the truck—a desideratum, it is claimed, not before attained. In short, to those acquainted with the requirements of a good car-truck the general and detailed advantages secured by this improvement will become at once apparent upon examination.

A patent was obtained upon this car-truck February 16th, 1869, by T. L. Wilson, assignor to Gyles Merrill and John W. Hobart. Further information can be obtained by addressing J. W. Hobart, St. Alban's, Vt., or T. L. Wilson, Montreal, C. E.

Patent Car-Fare Box.

JAMES B. SLAWSON'S patent for a car-fare box is an ingenious and much-needed device, and consists of a box with two chambers, one above the other, separated by a tripping platform, the upper chamber having two of its sides made of glass, so that the passenger and driver can see the deposit. By tilting the separating platform, the fare is transferred to the lower chamber, which is locked. By the use of this device, a railroad company saves the expense of a conductor and a conductor's (supposed) stealings. The roads that have adopted the invention are necessarily obliged to find some means of making change, and it is usual to place in a box, accessible to the driver only, a supply of sealed paper packages, each containing one ticket and sufficient change to make it equal to one of the smaller currency issues; that is, a ten-cent, a fifteen-cent, a twenty-five-cent, or fifty-cent package. This arrangement removes the serious difficulty that would otherwise arise, adds but little to the labors of the driver, and causes the passenger, in case he has not in hand the exact fare, no more trouble than passing his currency to the driver through a small opening in the front door, receiving his package in return, and depositing the inclosed ticket in the fare-box. The extension was granted.

EXPERIMENTS have been made with Camp's dumping-car at an excavation for the car-shops of the Lehigh Valley Railroad, in Wilkesbarre, Pa. It gives entire satisfaction, and the officers of the road who observed its working express themselves satisfied that it causes a great saving of labor.

"Jerk Water" on the Hudson River Railroad.

MR. BUCHANAN, Master Mechanic of this road, now has the arrangement for taking up water while running—which his men have christened with the above name—attached to thirteen locomotives. The railroad company has put down four water-troughs between New-York and Albany, each 1000 feet long. The fast trains on this road now stop only at Poughkeepsie, for meals and to change engines. Locomotive runners estimate that from ten to fifteen minutes are lost each time they stop to take water. As it is necessary to fill the tender three times in going over the road, by taking up a supply while running they save two stops, or from twenty to thirty minutes between New-York and Albany.

By this arrangement, the tanks can be filled while running at full speed, but ordinarily the engines are "slacked up" a little when water is taken, as the resistance of the water against the spout is so great when running fast that it is difficult for one man to raise it out of the trough unless the train is slowed. When running at full speed, the water is taken up so rapidly that there is danger of deluging the tender and washing the coal out of it in case the spout is kept down too long.

On the last engine the spout was made only nine instead of ten inches wide, as it was found that the larger size took water more rapidly than was required.

New Coupling Device.

MR. ALBERT PORTER, of Irving, Ill., has secured a patent for a coupling arrangement in which the ordinary form of link is used. Instead of the common pin, however, there is pivoted in a recess in the lower lip of the drawbar-head a sort of tumbling-hook, of the general form of a common garden hoe with a very short handle. It is pivoted at the angle, and, before the coupling is effected, the pin lies horizontally, projected forward. As the link enters the mouth, it strikes the vertical arm of the tumbling-hook, and by its pressure raises the pin to a vertical position *through the link*. When the pin has come to a vertical position, it is caught and held at the top by a gravitating catch at the top of the mouth of the draw-bar. The only way in which the cars may now be detached is by lifting this catch. This the inventor proposes doing by a connection to a lever either on the platform or top of the car.

The invention involves simply a change in the form of the drawbar-head, and, as the common link is used, there is no difficulty in connecting cars with this coupling to those of the old form.

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Correspondence.—*We cordially invite the coöperation of the railroad public in affording us the material for a good mechanical paper. Articles relating to rolling stock and machinery, by those practically acquainted with those subjects, will be gratefully received. All communications must be addressed to Vose, Dinsmore & Co., No.* 1 *Barclay Street.*

The name and address of the writer must accompany all communications designed for publication.

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Engravings and Illustrations.

We would invite the attention of Master Car-Builders and others to the advantages to be derived from publishing in The National Car-Builder *engravings designed to illustrate the various features and details of car construction, and especially such improvements as can not otherwise be clearly presented. We will procure cuts to be made in the best manner from drawings or models that may be sent us, and charge only for the cost of engraving, inserting the same in our paper with suitable descriptive details, without charge. The cuts thus made by us, or that may be sent us for use in* The National Car-Builder, *will of course be returned promptly to the owner.*

Master Mechanics' Association.

The following circular has been issued by the secretary, notifying the members of the time and place for holding their fourth annual meeting:

Chicago, August 1, 1871.

Dear Sir: The American Railway Master Mechanics' Association will convene for their fourth annual session at Louisville, on Tuesday, the 12th day of September next, and the increasing interest manifested in the association's progress gives assurance that this meeting will prove no less successful than those that have preceded it.

The committee have selected the Galt House as the association headquarters, and have arranged ample accommodations for all members at a liberal reduction from regular rates. As the sessions of the convention will be held in rooms provided at this hotel, it will be most convenient for members to have rooms there also.

It is earnestly hoped that your official duties will not prevent your attendance at this meeting.

If you purpose being accompanied by ladies, please notify me, and rooms will be reserved for you.

Respectfully yours,

L. P. Dodge, *Secretary.*

We anticipate a full attendance of delegates in view of the important business which will be presented for their action, and we hope to give some account of the doings of the convention in our next number.

Railway Accommodations East and West.

We frequently hear it said by people whose traveling experience enables them to judge, that passenger-cars of every class at the West are, as a rule, superior in elegance, cleanliness, and other requisites of comfort to those on our Eastern roads. Opinions to this effect are so often and so freely expressed, and so generally acquiesced in, that we are inclined to think they are not without some foundation in truth. There must be some perceptible difference in the style and accommodations of the cars in the two sections of the country, or else it would not be made a subject of remark as often as it is. We do not suppose, however, that passenger-cars of every class are not to be found everywhere on our Eastern roads as elegant and commodious in their construction and fitting up as any at the West, but we suspect that the number of such cars here is not as large in the aggregate, and that on our Eastern roads, especially in the vicinity of large cities, where the way-traffic is heavy, there is a much larger proportion of old and shabby cars in use than on the Western lines. If this is so—and we are not prepared to deny it—it is a reflection on the management, liberality, and enterprise of Eastern roads, and should suggest an inquiry into the causes which have led to it. The young and newly-settled West, with a comparatively sparse population, and as yet but partially redeemed from prairie and wilderness, should not be allowed to excel the older and more populous East in the matter of railway passenger equipment. We are not deficient in experience, capital, and other resources. The causes must be looked for elsewhere. The passenger traffic here is heavy and increasing, and secure against any prospective diminution. Competition is therefore less to be feared. The multitude must travel, as one of the inexorable necessities of life. The exigencies of duty, business, and pleasure require it, and they must make use of the means provided—good cars if they are to be had, or shabby, soiled, and antiquated ones if nothing better is at hand.

We do not, of course, undertake to decide how far the complaints to the detriment of Eastern roads are justified by actual facts. There is, doubtless, more or less exaggeration growing out of a natural feeling of rivalry; but, in most cases, exaggeration implies that there is something to exaggerate. We are ready to hear any arguments, facts, or suggestions that may be offered in denial or extenuation. In the mean time, we copy the following paragraphs from a recent number of the Chicago *Tribune*, as bearing upon the subject:

"There is a complaint strongly urged in the Eastern papers that railway companies have permitted their ordinary passenger-cars to so run down that passengers have now no option but to purchase seats in the palace-cars. It is claimed, and justly, that persons paying first-class fare are entitled to comfortable seats in cars having every reasonable convenience; and that, since the introduction of the palace-cars, railroad companies make no effort to oblige the public, and force the latter to pay extra fare for comfort to which they are entitled at the ordinary rates.

"While this is measurably true of railroads at the East, it does not hold good with regard to the Western roads. The railroads in the West have not permitted the palace-cars to supersede the regular cars of the roads, and on all trains leaving this city there are cars other than palace-cars which have every comfort and convenience, apart from sleeping accommodations, that can be desired. The Western roads, as a general thing, have not neglected to build new cars, nor have they adopted the policy of forcing a patronage of the palace-cars. They kept pace with the improvements, and the ordinary cars now leaving this city would have, by comparison, been styled palace-cars ten years ago. The tendency of the American people is to travel in the most expensive cars, which is not the case in other countries; and notwithstanding the fact that the Western roads are supplied with elegant cars, fitted up with every ordinary convenience, a preference is always given to the palace-cars."

Correspondence.

Narrow-Gauge Cars.

Toronto, Ontario, July 20, 1871.

Editor of The National Car-Builder:

Dear Sir: There has been so much discussion in the newspapers of late relative to narrow gauge, that your correspondent thought he would investigate the subject a little, believing that your readers would like to know how the cars are constructed. It is less than two years since the idea of a narrow gauge, three feet or three feet six inches in width, was suggested by some English engineers, as just the thing to help build up the sparsely settled portions of Canada, their theory being that the first cost of roadway and rolling-stock could be reduced to about one third that of the ordinary four feet eight and a half inch gauge, and that the operating expenses of such lines would be reduced to a minimum. They contended that they could build cars upon such a gauge which would have a carrying capacity of twice or three times their own weight, whereas, in the old system, the cars weigh quite as much as the loads they are designed to carry. The narrow-gauge theory was first carried into practice here, under the auspices of Edmund Wragge, Esq., the Chief Engineer of the Toronto, Grey, and Bruce Railway, and the Toronto and Nipissing Railway, a gentleman who studied his profession with Sir Charles Fox in England. The Americans, however, with their usual enterprise, are already constructing long lines of railway in Texas and elsewhere, of even narrower gauge than that adopted in Canada, which is three feet six inches. The narrow gauge can not as yet be called a perfect success here, because experiments are still being made to bring it to work properly in all its parts, while there are those who say that they can not see any advantage in the system, either as to first cost or in operating expenses. Time, which tries all things, will, however, determine this question. The design of these roads is, that they may be run over the hills, on almost any grade, and turn the shortest curves. The question has often been asked, how the cars can be built upon such a narrow base, and yet keep the centre of gravity so low, when loaded with freight, that they will not be thrown over when moving around sharp curves; the popular notion being that the cars must be built very high, in order to carry double or treble their weight in freight; but the key-note to the solution of this difficulty is in the use of heavy axles, extending far beyond the rails, upon which, of course, the wheels rest, the car bearing upon the axles at their ends, thus forming a base of nearly twice the width of the gauge, or say six feet. Of course there must be great leverage between the wheel and axle-box, which needs to be counterbalanced by greater strength of axles. The axles are thicker than those ordinarily used; and their weight and cost being an objection, Mr. Wragge is now experimenting with steel axles, weighing one hundred and sixty pounds each. The wheels used are two feet in diameter and of the ordinary pattern, though experiments are being made with wheels having steel tires. The axles extend out beyond the wheels, on either side, a distance of fourteen inches, measuring from the centres of the wheels to the centres of the journal-boxes. The freight-cars have each four wheels; no trucks are used, but each pair of wheels is held in position under the cars, eight feet six inches apart, by means of wrought-iron jaws or pedestals, which are bolted to the car body.

Eight journal-boxes fit into the pedestals and support inverted half elliptic springs, forty-two inches long, the ends of the springs having their bearings upon the car timbers. The running-gear, therefore, somewhat resembles that of street-cars.

The freight box-cars are fifteen feet eight inches long, and eight feet wide in the clear; it will be seen

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that they overhang the track considerably, being only six inches narrower than a car of the ordinary gauge. They weigh sixty-five hundred pounds, and their capacity is six tons, which is quite a convenient one, inasmuch as two narrow-gauge cars are thus equal to one car of the Grand Trunk Railway, with which they connect.

Two styles of flat cars have been constructed; one is eighteen feet long and seven feet wide in the clear, weighs six thousand pounds, and has a capacity of six tons; the other is thirty feet long, eight feet wide, weighs ten thousand five hundred pounds, and has a capacity of ten tons; the latter had at first a third pair of wheels under the centre, but not curving readily, they were taken out. The distance from the rail to the car floor is two feet seven inches. The passenger-cars are thirty feet, and, with the platforms, thirty-five feet long, and eight feet six inches wide, hung on four-wheeled swinging motion trucks, with wheels two feet in diameter, the axles overhanging as in the freight-cars. The cars are finished plainly, each containing seventeen double and three single seats, with cane bottoms and backs, the usual saloon occupying one corner. The accommodations are now arranged for thirty-seven passengers, but with a stove in winter, would be somewhat less. The passage-way is twenty-one inches wide, and the double seats thirty-seven inches wide.

The passenger and freight-cars were all built in Toronto, under Mr. Wragge's direction, by Messrs. William Hamilton & Son, and Messrs. Dickey, Neill & Co., two enterprising concerns, who are also building cars for various other Canadian roads. B.

Stock Cars.

St. Louis, Mo., August 25, 1871.

Editor of The National Car-Builder:

Dear Sir: The transportation of stock has certainly become, in this section of the country, one of the most important branches of railroad business. The roads running west and south-west of this city have greatly increased the number of their stock-cars, and are now prepared to load the vast herds of cattle that have accumulated at the terminus of their several lines just so soon as better prices in the cattle market induce shippers to move briskly. Visiting Abilene and other points on the plains where cattle are shipped for the Eastern market, and observing their progress in crowded cars from those distant places to the stock-yards of St. Louis and Chicago, one can not fail to perceive their depreciation in weight and general condition, occasioned by their long journey with its attendant deprivation of food and water, and the painful and unnatural confinement they are subjected to.

Humanity as well as the interest of the shippers demands some change from the present mode of cattle transportation. The palace stock-cars placed upon the roads by the company whose headquarters are in Chicago, are saving much money for the stock-owners, and much suffering otherwise endured by the poor beasts.

Still another improved mode of transportation has been devised and is now being put into practice by the "Western Refrigerator Car Company" of this city. For this company there has just been completed, at the works of the Missouri Car and Foundry Company, six refrigerator cars of improved design, and the most thorough construction.

These cars are 28 feet long, 8 feet wide, and 7 feet 6 inches high from floor to ceiling. They are lined entirely with zinc, and the floor, roof, sides, and ends are packed with charcoal, as are also the folding doors that open on both sides of the car. These doors are so arranged that, when closed, the car is made perfectly air-tight. Along the ceiling, extending from one end to the other of the car, is a zinc reservoir for ice, of a wedge form, 3 feet in depth, and about 20 inches wide at the top. Ice is placed in this reservoir from the roof of the car, there being four hatchways, one at each end and two others situated at equal distances between. The water from this tank is drained by a galvanized-iron pipe at one end of the car, the outlet of which is so arranged that none of the cold air can escape, nor warm air find its way into the ice-chamber by that means. Along both sides of this reservoir are placed iron rods upon which to hang beef and other dressed meat.

It is the object of the company owning these cars, to avoid transportation of live cattle, and to furnish the market with fresh meat killed and dressed on the plains.

Among other savings resulting from this plan is that of freight, as all useless weight is dispensed with and shippers pay freight on that only which will sell for profit here.

The design of these cars has been patented by the inventor, Mr. R. J. Tunstall. Some fifty more of them, we hear, will soon be placed on the roads. They are sure to find favor with shippers of marketable produce of all kinds, particularly fruits and dairy productions. Missouri.

New Publications.

The Carriage-Painter's Companion, published by John W. Masury, 111 Fulton street, New-York. This little volume is replete with valuable information upon the subject indicated by its title. Its typography, paper, and binding are excellent, and it is beautifully illustrated with sample-cards, displaying all the colors used in carriage-work, each color being accompanied with a full description of its peculiar properties, with practical hints and suggestions as to the best mode of applying the same. Embodying as the volume does the experience of twenty-five years in the paint-shop, it must be a valuable manual for all who are interested in this branch of the trade.

Gear's Illustrated Mechanical Advocate is the title of a monthly journal published by A. S. & J. Gear and Co., 56 Sudbury street, Boston, and devoted to the interests of purchasers of wood and iron-working machinery and supplies. The first number is very attractive in its appearance, and contains numerous illustrations with appropriate descriptive articles. The publishers have had a practical business experience of many years in buying, selling, using, and building machinery, and their journal can not but prove a valuable medium of information for manufacturers, dealers, and others. Its aim will be to discriminate in favor of worthy and meritorious inventions, and expose and denounce such as are worthless or deficient. Price, $1 per annum.

The Patent-Right Gazette is a new illustrated journal, published monthly by the Inventors' Exhibition and Patent-Right Association of New-York. The object of the association is to make known to the public the newest and most valuable patents, and to procure the same for inventors, and negotiate their sale. The number before us contains a variety of interesting articles, and is illustrated with numerous engravings. Office of publication, 12 Warren street, New-York. Terms, $1 per year.

The *American Manufacturer and Trade of the West*, a weekly manufacturing paper published in Pittsburg, is a consolidation of the two papers heretofore published under the names of the *American Manufacturer's Review* and *Trade of the West*. The consolidated issue is a large and attractive paper, containing a great variety of trade news, market reports, editorial comments, and selected matter. We commend it to the attention of manufacturers and the business community generally.

The new Third Avenue palace street-car, built at a cost of $4000, and charging ten cents extra fare, has thus far paid $10 per day profit more than the ordinary cars.

Miscellaneous Items.

Mr. Charles Scoville has resigned the position of master mechanic of the Illinois Central car-shops, which he has held for many years, in order to take charge of the private car-building establishment now being erected in Chicago, on Blue-Island avenue near Twenty-second street, by Messrs. Wells, French & Co., the well-known bridge-builders.

Mr. Scoville stands very high as an executive officer and car-builder, and is also very popular among his friends, whose name is legion. He carries with him to his new position their best wishes for his continued success and prosperity. Messrs. Wells, French & Co. are to be congratulated, not only upon securing so valuable a manager, but also upon their perception of the fact that Chicago is one of best locations that can be found for a large car manufactory, the only wonder being that the field has not been occupied before. We understand that their buildings and machinery will be ready to commence operations about the 1st of September.

Mr. Horace O. Wadlie has been appointed master car-builder of the Illinois Central Railroad, in place of Mr. Charles Scoville, resigned. Mr. Wadlie's appointment took effect on the 15th ultimo. During the past four years he has had charge of the Lake Shore and Michigan Southern car-shops, at Norwalk, Ohio. He was previously connected with the Winona and St. Peter and Erie Railroads, and has also had charge of a repair-shop on the line of the Illinois Central. He is regarded as a very capable and energetic officer, and his recent appointment is a valuable acquisition to the road.

Mr. Charles Callis Western, founder and originator of *The Manufacturer and Builder*, is no more. From the same publication we learn that he died suddenly at the age of 29 years, thus cut off in a brilliant career of scientific journalism.

The American Institute Fair for 1871 will be opened to the public at the Empire Rink, New-York, between Second and Third avenues, and Sixty-third and Sixty-fourth streets, on the 7th of September, and remain open until the 4th of November. Thirteen thousand square feet of floor and gallery will be added to the rink, making the total space upward of ninety-three thousand square feet. No medals will be awarded, except the great medal of honor, to the discoverer or inventor of a machine. In lieu of the medals and diplomas hitherto granted, the exhibitors will be entitled to official copies of the judges' report.

Although the Mont Cenis tunnel, under the Alps, has been pierced and locomotives have passed through it, doubts are entertained in France as to its being opened to travel for some time to come. The trouble is in the ventilation of the tunnel. The smoke evolved from the locomotives is not driven out. Out of three engine-drivers who were employed on the trial-trip through the tunnel, two died of suffocation and the third was restored to life with great difficulty. The temperature of the interior is also very high. Efforts to improve the ventilation of the tunnel are being made, and smoke-consuming engines have been ordered from England to remove the difficulty arising from that cause. This is not all. Cable dispatches state that a large portion of the roof has fallen in, and many workmen were buried. Seven corpses have been recovered, and others remain to be exhumed. Similar breaks at other points are apprehended, and supports of immense strength are being prepared to guard against such a contingency.

The Ohio Falls Car Company delivered cars and coaches to the value of $195,453 during the month of July last, which is the largest month's work ever delivered by any car-works in the country.

THE Joliet (Ill.) *Signal* has the following concerning the new rolling-mills and steel-works at that place: "Mr. Meeker has finally completed arrangements for the erection of steel-works and custom-mills in connection with the rolling-mills already in operation here. Work will be commenced on the buildings at once, the contract having been let to Mr. Mitchell, and the carpenter work to Mr. Francis Layfield. The buildings are to be of extensive dimensions, one of them nearly five hundred feet in length. Upon the completion of these works, it will be necessary to employ twice as many men as are at present at work in the mills here, which will increase the number to seven hundred. The contract for the erection of twenty-five additional dwelling-houses, for the accommodation of foremen and leading operatives, has been assigned to Mr. Layfield by the same parties."

HORATIO ALLEN has handed in to the Poughkeepsie Bridge Company a plan for a suspension-bridge 130 feet above the surface of the water and 3400 feet in length, with two spans of 1100 feet in length, and half spans of 650 feet each, the towers to be of masonry and the foundations to be constructed 70 feet below the surface of the water. The cables are to be of steel or iron, and the carrying capacity of the bridge to be half a ton to the lineal foot. The whole structure is to cost $2,600,000.

THE Baldwin Locomotive-Works have just completed a model of a locomotive, and the Jackson & Sharp Company a model of a car, for the commission which is about to visit Japan in the interest of its government. They are both made to a scale of 1 inch = 1 foot, and are complete in all their parts. The locomotive especially shows every detail. It is not a working model, but will illustrate every part, and serve to give a clear idea of the construction and equipment of an American railroad. The model was built by John Divine, a graduated apprentice from this establishment.

AN experiment, known as the "lunch-basket system," has been recently tried on one of the railroads in England. It is designed for the accommodation of the traveling public, who have no opportunity to obtain refreshments on long journeys. The contractors furnish baskets of an easily portable and compact size and form, well stocked with the materials for a comfortable luncheon—that is to say, half a fowl, ham, bread and butter, cheese, salad, a pint of claret or other light beverage, plates, knives and forks, glasses and napkins—the price being three shillings. The baskets, which are made for the purpose, are provided with every necessity and convenience, and inside the lid is affixed a printed card, requesting that, as no deposit is required nor charge made for the use of the conveniences in the basket, all the articles be replaced in their proper positions, and the basket delivered up complete at the end of the journey.

THE Lake Shore and Michigan Southern Railroad Company have commenced the planting of trees alongside its track, eleven thousand chestnuts and ten thousand European larches having been planted along its line between White Pigeon and Toledo, through the country where the forests have been mostly cleared away and the supply of timber is scantiest. The work was most thoroughly done, with the intention that every tree might live; and the cost, including the time of the laborers, who belonged to the regular force of the road, and did this work in connection with and in addition to their ordinary duties, was an average of eight cents per tree; excluding the labor of the company's ordinary employees, the cost was only four cents per tree.

THE Iron-Works Company at Fall River are now building seventy-four large boilers. Seventy-two of these are for the new Durfee, Granite, and Stafford Mills. They are the common cylinder-boiler, and are each 50 feet long by 2½ feet diameter. Some fifty men are now employed on these boilers.

THE New-Jersey Railroad and Transportation Company are building some new passenger-coaches replete with all the modern improvements. They are provided with the Ashbel Welsh six-wheel truck, and will seat sixty passengers each. Six of them have just been placed on the track, and six more are still in the shops. Mr. George W. Brown is foreman of the shops, and Mr. David H. Baker is superintendent of the car department.

A CORRESPONDENT of the *Scientific American* suggests an improvement in railway cars, by which weight and cost would be diminished, and greater security insured. It is simply to frame the body of the car, sides, ends, and roof, of iron rods—in a word, to construct a cage. This might be covered with leather; *papier mâché*, or even wood, might be introduced to any extent indicated by convenience or taste. In case of any kind of accident, the danger to passengers would be less from the bending of iron rods than from the breaking up of the wood; and injury to cars would often be easily repaired at a comparatively small cost.

THE Harlan and Hollingsworth Company employ about 800 men at their works in Wilmington, Del. Their chief business is iron ship-building, but about 300 men are engaged on car-work. They are now making three drawing-room cars for the through line from Philadelphia to Niagara, over the North-Pennsylvania, Lehigh Valley, and Erie roads. This line will strike the Erie road at Waverley. The cars are 60 feet long and 10 feet wide, and will accommodate 48 passengers. The trucks have six wheels, and are what is known as Welsh's truck, as it was designed by Mr. Ashbel Welsh, President of the United Railroad Companies of New-Jersey. The Harlan and Hollingsworth Company are also building five Pullman cars, and rebuilding three more; are building six passenger-cars for the West-Wisconsin road—four of which have just been shipped; two for the Jackson, Lansing, and Saginaw, and six for the Evansville, Terre Haute, and Chicago line.

Facetiæ.

CHICAGO ladies at social gatherings say, "How splendidly Mrs. Smith is dressed; the first time she has been out since her divorce, too."

IT has just been decided by a Maine debating society, that no woman should talk about "rights" until she can show a clean and healthy baby.

SAXE says that Vermont is famous for four staples, "men, women, maple-sugar, and horses. The first are strong, the last are fleet, the second and third are exceedingly sweet, and all are uncommonly hard to beat."

"POMPEY, de corn's up."

"De corn up! Why, I only planted it yesterday."

"I know dat; but de pigs got in last night and guv it a lift."

AN upholsterer, whose house is in Somerville, had a sample of some thick, coarse, large-figured foreign cloth, used for covering furniture, in the shop-window, when a member of the Legislature came along.

"How much is this a yard?" inquired he.

"Seventy-five cents, sir."

"Will it wash?"

"Yes, sir."

"I'll take a yard for a handkerchief."

And the statesman marched off with a big bundle of cloth, as thick as sheep-skin, with which to keep his nose clean.—*Somerville Journal.*

A BROOKLYN politician, in writing a letter of condolence to the "widow of a country member," who had been his friend, says, "I am pained to hear that Harry has gone to heaven. We were bosom friends; but now we shall never meet again."

MRS. ATKINSON, of Providence, thus sums up her three years' experience of married life: "The first year my husband called me 'My dear;' the second year, 'Mrs. A.;' and the third year, 'Old sorrel-top.' This last I could *not* stand."

A WESTERN editor, who doesn't know much about farming any way, suggests that for garden-making a cast-iron back, with a hinge in it, would be an improvement on the spinal column now in use.

AN Indianapolis German had occasion recently to bury a large wife, and so squabbled with the sexton about the fee. "Dat ish not a big grave," said the disconsolate husband. "Not a big grave!" indignantly responded the sexton; "why, bless you, that's a cellar!"

THE editor of an Indiana paper recently enjoyed the luxury of a bath, and a leading article in the last issue of his paper describes vividly his strange sensations while the operation was in progress.

"A MAN who would maliciously set fire to a barn," said good old Elder Porson, "and burn up a stable full of horses and cows, ought to be kicked to death by a jackass, and I'd like to be the one to do it."

ON the departure of Bishop Selwyn for his diocese in New-Zealand, Sydney Smith took leave of him as follows: "Good-by, my dear Selwyn; I hope you will not disagree with the man who eats you."

WITH four metallic qualifications a man may be pretty sure of success in the world. These are gold in his pocket, silver in his tongue, brass in his face, and iron in his heart.

Punch says that a Yankee baby will crawl out of his cradle, take a survey of it, invent an improvement, and apply for a patent before he is six months old.

A WESTERN paper accuses a contemporary of "dirty meanness," and remarks, "We want him to understand that two can play at that game." A rather frank avowal.

A YOUTH of Washington carries a lot of live snakes in his pockets, and isn't a bit afraid of pickpockets either.

Car-Wheel Manufacturers.

Atlantic Iron-Works	Portsmouth, Va.
Barnum & Richardson Manufacturing Co.	Chicago, Ill.
Barney & Smith Manufacturing Co.	Dayton, Ohio.
Bass & Hanna	Fort Wayne, Ind.
Davenport, Fairbairn & Co	Erie, Pa.
Dawson Manufacturing Co	Dawson, Ga.
Detroit Car-Wheel Works	Detroit, Mich.
Fulton Foundry Co	Cleveland, Ohio.
Gill & Bidwell	Allegheny City, Pa.
Green, D. P. & Co	St. Louis, Mo.
Harrisburg Car Manufacturing Co.	Harrisburg, Pa.
Jackson & Woodin	Berwick, Pa.
John L. Gill	Columbus, Ohio.
Lobdell Car-Wheel Works	Wilmington, Del.
Missouri Car and Foundry Co	St. Louis, Mo.
Moore Elastic Car-Wheel Co	Jersey City, N. J.
Mowry Car and Wheel Works	Cincinnati, Ohio.
Ohio Falls Car Co	Jeffersonville, Ia.
Pettengill, Glass & Co	Cleveland, Ohio.
Quealey, W. J	Hannibal, Mo.
Ramapo Wheel & Foundry Co	Ramapo, N. Y.
Scoville, J. & N. C	Buffalo, N. Y.
St. Louis Car-Wheel Co	St. Louis, Mo.
Taylor Iron Works	High Bridge, N. J.
Thompson, Douglas	Bordentown, N. J.
Tredegar Company	Richmond, Va.
Washburn, Hunts & Co	Jersey City, N. J.
Wason Manufacturing Co	Springfield, Mass
Whitney & Sons	Philadelphia, Pa.
Woodbury & Company	E. Cambr'ge, Mass.
Wyoming Valley Manufacturing Co	Wilkesbarre, Pa.

Locomotive Builders.

Baldwin Locomotive Works	Philadelphia, Pa.
Brooks Locomotive Works	Dunkirk, N. Y.
Danforth & Cooke	Paterson, N. J.
Dickson Manufacturing Co	Scranton, Pa.
Grant Locomotive Works	Paterson, N. J.
Hinckley & Williams	Boston, Mass.
Manchester Locomotive Works	Manchester, N. H.
Mason, William	Taunton, Mass.
McKay Iron and Locomotive Works	Jersey City, N. J.
Portland Company	Portland, Me.
Pittsburg Locomotive Works	Pittsburg, Pa.
Rogers Locomotive Works	Paterson, N. J.
Rhode Island Locomotive Works	Providence, R. I.
Schenectady Locomotive Works	Schenectady, N. Y.
Porter, Bell & Co. (light locomotives)	Pittsburg, Pa.
Taunton Locomotive Works	Taunton, Mass.

DIRECTORY

OF

MASTER MECHANICS AND MASTER CAR-BUILDERS

THROUGHOUT THE UNITED STATES AND CANADA.

Railroad.	*Master Mechanic.*	*Master Car-Builder.*	*Residence.*
A			
Arkansas Central	G. H. Bristol	G. H. Bristol	Helena, Ark.
Alabama Central	J. B. Travis	J. B. Travis	Selma, Ala.
Albany & Susquehanna	R. C. Blackall	R. C. Blackall	Albany, N. Y.
Atlantic & Great Western			Kent, Ohio.
Atlantic & Gulf	C. Collins	J. Sullivan	Savannah, Ga.
Alexandria & Fredericksburg			Alexandria, Va.
Alabama & Chattanooga	H. M. Smith	H. M. Smith	Chattanooga, Tenn.
Atlantic & North-Carolina	E. J. Clayton	E. J. Clayton	New-Berne, N. C.
Atlanta & West-Point	Wm. Rushton		Atlanta, Ga.
Atlanta & West-Point	R. D. Cole		Newnan, Ga.
Atlantic & Pacific	John Hewitt	John Hewitt	Franklin, Mo.
Allegheny Valley	G. W. Glass	R. Gunning	Pittsburg, Pa.
Androscoggin	Ira K. Russell	C. S. Greenwood	Farmington, Maine.
Adirondack			Saratoga, N. Y.
B			
Bay de Noquet & Marquette	John J. Murphy	H. D. Lyons	Marquette, Mich.
Bangor, Old Town & Milford	J. B. Peckham	John H. Brown	Bangor, Maine.
Bennington & Rutland	John Haining		Rutland, Vt.
Baltimore & Ohio	John C. Davis	John C. Davis	Baltimore, Md.
Bellefonte & Snow Shoe	H. D. Landis	H. D. Landis	Bellefonte, Pa.
Belvidere Delaware	R. McDowell	John Silvers	Lambertville, N. J.
Boston & Albany	Wilson Eddy	F. D. Adams	Springfield, Mass.
Boston & Albany	A. B. Underhill	W. E. Chamberlain	Boston, Mass.
Boston & Providence	George Richards	John Lightner	Roxbury, Mass.
Boston, Clinton & Fitchburg	John Webster	Samuel Stevens	Fitchburg, Mass.
Boston, Concord & Montreal	R. Adams	M. R. Elkins	Lake Village, N. H.
Boston & Maine			Boston, Mass.
Boston & Maine		D. C. Richardson	Lawrence, Mass.
Boston & Lowell & W. L	L. R. Winslow	S. A. Davis	Boston, Mass.
Blossburg & Corning	O. C. Patchell	O. C. Patchell	Corning, N. Y.
Brockville & Ottawa	Joseph Cockfield	Joseph Cockfield	Brockville, Can.
Blue Ridge			Anderson, S. C.
Burlington & Missouri River	G. Chalender	G. Chalender	Burlington, Iowa.
Burlington, Cedar Rapids & Minn	Wm. Swanston	Wm Swanston	Cedar Rapids, Iowa.
Buffalo & Washington			Buffalo, N. Y.
Boston, Hartford & Erie	I. E. Wiggins	Elias Pratt	Boston, Mass.
Buffalo, Corry & Pittsburg	Thomas Connell	Thomas Connell	Corry, Pa.
Buff. Bayou, Brazos, Colorado	E. Perry	M. Borst	Harrisburg, Tex.
C			
California & Pacific	O. R. Ford	D. Rutherford	Vallejo, Cal.
Camden & Amboy	F. B. Stevens		Hoboken.
	T. T. Kerr	E. Lockwood	Bordentown, N. J.
	Thomas Single		South-Amboy.
Camden & Atlantic	E. Collings	S. Wills	Camden, N. J.
Catawissa	A. J. Prescott	G. P. Fenstermacher	Catawissa, Pa.
Cape Cod	E. A. Walker	William Cannon	Hyannis, Mass.
Calais & Baring	Chas. W. Butler	Chas. W. Butler	Milltown, Me.
Catasauqua & Fogelsville	Thomas Evans	Chas. S. Holbach	Catasauqua, Pa.
Carrolton & Oneida	M. T. Wiggins		Carrolton, Ohio.
Charleston & Savannah	H. T. Calder		Charleston, S. C.
Chesapeake & Ohio	W. G. Freeman	J. N. King	Richmond, Va.
Cheraw & Darlington	D. W. Haines		Florence, S. C.
Champlain Trans. Co	H. T. Calder		Burlington, Vt.
Cheshire	F. A. Perry	F. A. Perry	Keene, N. H.
Charlotte, Columbia & Augusta	Robert King	J. Q. Leats	Columbia, S. C.
Chicago & North-western		Thomas Hull	Chicago, Ill.
Wiscon. Mad. & Mill. Divis	T. B. Tilton	Henry Hull	Fond du Lac, Wis.
Galena Division	R. W. Bushnell	Hugh Gray	Chicago, Ill.
Chicago & N. W. Iowa Division	C. C. Elliott	William Campbell	Clinton, Iowa.
Chicago & N. W. Peninsula Division	S. L Pierce		Escanaba.
Chicago & Alton	John A. Jackman	R. Reniff	Bloomington, Ill.
Chicago, Burlington & Quincy	C. F. Jauriet	W. W. Wilcox	Aurora, Ill.
Chicago, Cincinnati & Louisville	C. F. Kidder	D. B. Howe	La Porte, Ind.
Chicago, Rock Island & Pacific	T. B. Twombly	B. K. Verbryck	Chicago, Ill.
Chicago, Michigan & Lake Shore	E. I. Reynolds		St. Joseph, Mich.
Cleveland, Col., Cin., & Indianapolis	L. S. Young	William F. Smith	Cleveland, Ohio.
Cleveland and Pittsburg	N. E. Chapman	N. E. Chapman	Cleveland, Ohio.
Cleveland, Zanesville & Cincinnati	J. W. Holloway	J. W. Holloway	Akron, Ohio.
Cincinnati, Hamilton & Dayton	William Cullen	W. H. Allison	Cincinnati, Ohio.
Cincinnati & Zanesville	Peter Green	D. J. Jewell	Lancaster, Ohio.
Cincinnati & Indianapolis Junction	J. H. Keith	W. W. Degnacey	Cambridge, Ind.
Cincinnati, Sandusky & Cleveland	John T. Beatty	William Earick	Sandusky, Ohio.
Columbus, Chicago & Indiana Central	(See Pitts. Cinn. & St. Louis)		
Concord	E. Studley	M. W. Dickerman	Concord, N. H.
Concord & Claremont	J. N. Lander	A. Langmaid	Concord, N. H.
Connecticut River	John Mulligan	R. Hitchcock	Springfield, Mass.
Contoocook River			Concord, N. H.
Conn. & Passumpsic Rivers	Horace Alden	Horace Alden	Lyndon, Vt.
Cumberland Valley	A. S. Hull	C. W. Nitterhouse	Chambersburg, Pa.
Cumberland & Pennsylvania	W. L. Jordan	J W. Sauerbach	Mt. Savage, Md
Central of Georgia	B. L. Boulineau	C. C. Millar	Savannah, Ga.
Central of New-Jersey	†T. W. Peeples	George Hackett	Elizabethport, N. J.
Central Branch Union Pacific	Wm. D. Rowley		Atchison, Kansas.
Central R. R. of Iowa	W. J. Ribley	W. J. Ribley	Eldora, Iowa.
Central Pacific	A. J. Stevens	Benjamin Welch	Sacramento, Cal.
D			
Dayton & Union	A. J. Keenan	J. F. Feicht	Dayton, Ohio.
Danbury & Norwalk	Charles A. Craig	Wm. W. Bedient	Danbury, Ct.
Dayton & Michigan	William Cullen,	W. H. Allison	Cincinnatti, Ohio.
Delaware, Lackawanna & Western	Walter Dawson	Robert McKenna	Scranton, Pa.
Des Moines Valley		R. E. Smith	Keokuk, Iowa.
Detroit & Milwaukee	B. Briscoe	B. Briscoe	Detroit, Mich.
Delaware & Hudson Canal Co	James Dickson	Thomas Orchard	Carbondale, Pa.
Dorchester & Delaware			Cambridge, Md.
Dubuque South-western			Farley, Iowa.
Dutchess & Columbia			Washington, N. Y.
E			
Eastern		J. P. Somerby	Salem, Mass.
Eastern	John Thompson		East-Boston, Mass.
East-Tennessee & Virginia	Jos. Armbruster	Jos. Armbruster	Knoxville, Tenn.
East-Tennessee & Georgia	Eli Hixon		Knoxville, Tenn.
East-Pennsylvania	J. M. Geary	Samuel Reeves	Reading, Pa
Erie Railway	*E. O. Hill		Susquehanna, N. Y.
Erie Railway	James B. Gregg		
Erie Railway	H. L. Brown	C. A. Smith	Jersey City, N. J.
Erie Railway	M. E. Brown	M. Wilder	Buffalo, N. Y.
Erie Railway	W. E. Cooper	W. E. Cooper	Hornellsville, N. Y.
Erie Railway		W. E. Rutter	Elmira, N. Y
Evansville & Crawfordsville	John L. White	A. Sharra (fore'n)	Evansville, Ind.
Evansville, Henderson & Nashville	W. H. McCafferty	W. H. McCafferty	Nashville. Tenn.
F			
European & North Am. (of Maine)	A. O. Bailey	J. H. Brown	Oldtown, Maine.
Erie & Pittsburg	John Young	John Young	Erie, Pa.
Eldora			Dubuque, Iowa.
F			
Florida	A. W. Taylor	G. Hernandez	Fernandina, Fla.
Flint & Pere Marquette	Sanford Keeler	Sanford Keeler	East-Saginaw, Mich.
Fitchburg	Geo. A. Cooledge	Enos Varney	Charlestown, Mass.
Fitchburg & Worcester	John Webster	Samuel Stevens	Fitchburg, Mass.
G			
Grand Trunk	*Richard Eaton	J. W. W. McWood	Montreal, Canada.
Galveston, Houston & Henderson	William McBeth	E. J. Sherman	Galveston, Texas.
Grand River Valley		James Potts	Jackson, Michigan.
Grand Rapids & Indiana			Fort Wayne, Ind.
Great Western of Canada	*Wm. A. Robinson		Hamilton, Canada.
Georgia	William Hardman	T. M. Preval	Augusta, Ga.
Greenville & Columbia	J. T. Price	J. T. Price	Helena, S. C.
Hl			
Hanover Branch	John J. Bingley	Henry Britcher	Hanover, Pa.
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Hannibal & St. Joseph	H. A. Towne	H. C. Whiting	Hannibal, Mo.
Hartford, Providence & Fishkill	Edwin Garfield	V. D. Perry	Hartford, Ct.
Hackensack & New-York	Abra'm Angausen		Hackensack, N. J.
Hastings & Dakota	C. C. Clements		Hastings, Minn.
Housatonic	C. R. Morris	J Ferris	Bridgeport, Ct.
Houston & Texas Central	A. W. Scoble	J. H. Bell	Houston, Texas.
Houston Tap & Brazoria	A. Malsch	R. H. Yeomans	Houston, Texas.
Huntington & Broad-Top Mountain	D. G Gilchrist	M. Tellerhoof	Saxton, Pa.
Hempfield	T. Marsh		Wheeling, Va.
Hudson River	Wm. Buchanan	John McKenna	New-York.
Hudson River	John Dykeman	Charles D. Mills	East-Albany, N. Y.
Houston & Great Northern		J. H. Bell	Houston, Texas.
I			
Indianapolis, Cincinnati & Lafayette	H. M. Britton	H. M. Britton	Cincinnati, Ohio.
Indianapolis, Peru & Chicago	John McKenna	John McKenna	Peru, Ind.
Illinois Central	S. J. Hayes	H. O. Wadlie	Chicago, Ill.
Iowa & Missouri State Line			Farmington, Iowa.
Iron	Perry Scott	Clem. Roetling	Ironton, Ohio.
Indianapolis & St. Louis	C. E. Benton	C. E. Benton	Mattoon, Ill.
Indianapolis, Bloomington & Western	J. T. Otis	S. S. Smith	Urbana, Ill.
Ionia & Lansing	H. Loughlin		Lansing, Mich.
J			
Jeffersonville, Madison & Indiana	Reuben Wells	John Higgins	Jeffersonville, Ind.
Jackson, Lansing & Saginaw	Andrew Wilson	A. Wilson	Jackson, Michigan.
K			
Keokuk & St. Paul	P. R. Sutton	Wm. McElroy	Keokuk, Iowa.
Knox & Lincoln			Bath, Maine.
Kentucky Central	J. R. Ledyard	J. L. Hackenthorn	Covington, Ky.
Knoxville & Charleston			Knoxville, Tenn.
Kansas Pacific	Geo. W. Cushing	Geo. W. Cushing	Wyandotte, Kansas.
Kalamazoo, Allagan & Grand Rapids			Kalamazoo, Mich.
Kansas City, St. Joseph & Council Bluff	H. L. Cooper		St. Joseph, Mo.
L			
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Lackawanna & Bloomsburg	Chas. Graham		Kingston, Pa.
Lehigh Valley	J. Kinsey		South-Easton, Pa.
Lehigh Valley	P. Hofecker	E. R. Brown	Weatherly, Pa.
Lehigh Valley	A. Mitchell	Mauch Chunk, Pa.	Delano, Pa.
Lehigh Valley	D. Clark		Hazelton, Pa.
Lehigh & Susquehanna	L. C. Brastow	L. C. Brastow	Wilkesbarre, Pa.
Lehigh & Susquehanna	Wm. H. Brown		Mauch Chunk, Pa.
Leavenworth, Lawrence & Gal	S. Philbrick		Lawrence, Kansas.
Lewy's Island	C. W. Button	Damase Merceir	Milltown, Maine.
Little Rock & Fort Smith			Little Rock, Ark.
Lebanon Springs			Burlington, Vt.
London & Port Stanley			London, C. W.
Louisville, New-Albany & Chicago	Jacob Losey	Jacob Losey	New-Albany, Ind.
Long Island	Chs. A. Thompson	B. T. Little	Hunter's Point, L.I.
Louisville, Cincinnati & Lexington	John Skidmore	Theo. G. Shaw	Louisville, Ky.
Louisville & Nashville	Thatcher Perkins	Thatcher Perkins	Louisville, Ky.
Lake Shore & Michigan Southern	†James Sedgley	John Kirby	Cleveland, Ohio
Michigan Southern Division	William Hill		Elkhart, Ind.
" " "		D. Sutherland	Adrian, Mich.
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Erie Division	L. O. Gassett	Jas. Withycombe	Cleveland Ohio.
Buffalo Division	B. H. Kidder.	J. N. Mileham	Buffalo, N. Y.
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Maine Central	J. W. Philbrick	J. W. Philbrick	Waterville, Me.
Macon & Western	B. Pope Freeman	James A. Knight	Macon, Ga
Manchester & Lawrence	Edward Studley	M. W. Dickerman	Concord, N. H.
Macon & Brunswick	M. Thornton	M. Thornton	Macon, Ga.
Maysville & Lexington			Maysville, Ky.
Marietta & Cincinnati	E. Bosley	E. Bosley	Chillicothe, Ohio.
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Memphis & Little Rock	N. Greener	W. A. Bond	Huntsville, Ark.
Memphis & Charleston	Michael Burk	A. W. Drew	Memphis, Tenn.
Memphis & Charleston	L. M. Sellars	Fabien Varin	Huntsville, Ala.
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Milwaukee & St. Paul		John Baillie	Milwaukee, Wis.
Milwaukee & St. Paul	J. Pattee	D. F. Wilson	Minneapolis, Minn.
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Montgomery & Eufaula	James McCann	I. E. Holmes	Montgomery, Ala.
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Mobile & Girard	William Eyles	A. J. Nix	Girard, Ala.
Mobile & Ohio	L. J. Fleming	John McHugh	Mobile, Ala.
	B. S. Skates	B. S. Skates	Whistler, Ala.
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Missouri, Kansas & Texas	C. T. McIlvaney	I. Townsend	Sedalia, Mo.
N			
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Nashville & Decatur	C. B. Knowles	C. B. Knowles	Nashville, Tenn.
New-Bedford & Taunton	Robert Chase	Robert Chase	New-Bedford, Mass.
New-Canaan			New-Canaan, Ct.
New-Brunswick & Canada	T. Armstrong	T. Armstrong	Saint Andrew's, N.B.
New Haven & Northampton	Henry Fox	Henry Fox	Westfield, Mass.
New-York & Oswego Midland	Wm. H. Griggs	Wm. H. Griggs	Oswego, N. Y.
New-York & Harlem	Wm. M. Strong	Leander Garey	New-York.
New-York Central	* C. T. Ham	Joseph Jones	Albany, N. Y.
New-York Central	G. B. Van Vorst		Albany, N. Y.
New-York Central	Henry Watkeys		Syracuse, N. Y.

* General Master Mechanic. † Mechanical Engineer.

* Mechanical Superintendent. † General Master Mechanic.
‡ General Master Mechanic and Master Car-Builder.

Railroad.	Master Mechanic.	Master Car-Builder.	Residence.
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New-York Central		Wm. Johnson	Buffalo.
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New-Jersey Southern	Rufus Blodgett	H. A. Webster	Manchester, N. J.
New-Haven & Derby			New-Haven, Ct.
New-Orleans, Opelousas & Gt. Western	John McCluskey	Matthew Nolan	Algiers, La.
New-Lisbon			Leetonia, Ohio.
New-Orleans & Ohio	John R. Jordan	John R. Jordan	Paducah, Ky.
New-Orleans, Jackson & Gt. Northern	John Conlon	Charles Bartine	New-Orleans, La.
New-Haven, Hartford & Springfield			Hartford, Ct.
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Newark & Bloomfield	Luke F. Tronson		Hoboken, N. J.
Nova Scotia	W. Johnson		Bedford, N. S.
North-Missouri	John Calhoun	C. S. Buck	St. Louis, Mo.
North-Carolina	E. Wade	B. G. Sergeant	Co. Shops, N. C.
New-Orleans, Mobile & Texas	Josiah Bettis	Josiah Bettis	Mobile, Ala.
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Northern Central		G. W. Demarest	York, Pa.
North-Lebanon		Henry B. Oves	Lebanon, Pa.
North-Pennsylvania	Franklin Roop	Franklin Roop	Philadelphia, Pa.
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Northern	James W. Lander	Albert Langmaid	Concord, N. H.
Northern of New-Jersey	T. W. Demarest		New-York.
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Norfolk & Petersburg	J. S. Whitworth	J. S. Whitworth	Norfolk, Va.
Northern Pacific	Geo. W. Cushing		Duluth.

O

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Oswego & Syracuse		J. H. Parker	Oswego, N. Y.
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Oil Creek & Alleghany River	J. S. McElroy	Jacob Williams	Corry, Pa.
Oil Creek & Alleghany	H.J.Bookhammer	John Monks	Oil City, Pa.

P

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Pennsylvania	D. O. Shaver	R. S. Ramsey	Pittsburg, Pa.
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	Robert Curtis	Theo. Chamberlain	Columbus, Ohio.
	Thomas Denmead		Dennison, Ohio.
	Thomas V. Losee	John Gottschall	Indianapolis, Ind.
		James McGee	Steubenville, Ohio.
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Pittsburg, Fort Wayne & Chicago	J. M. Boon	Wm. Waddington	Fort Wayne, Ind.
Pittsburg & Connellsville	D. P. Rennie	J. M. Rutter	Connellsville, Pa.
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Portland & Kennebec	John Ellis	J. W. Trussel	Augusta, Me.
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Port Huron & Lake Michigan			Port Huron, Mich.
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Petersburg	R. B. Adams	Alex. Wright	Petersburg, Va.
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Peninsular R. R	T. G. Templeton		Battle Creek, Mich.

R

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Richmond Danville & Piedmont	John McFarland	H. Longest	Richmond, Va.
Richmond & Petersburg	Wm. Piermont	J. J. Martin	Richmond, Va.
Richmond & York River			Richmond, Va.
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Reading & Columbia	B. Van Lew		Columbia, Pa.
Rome, Georgia	O. W. Harbin	O. W. Harbin	Rome, Ga.
Rochester & Genesee Valley	M. E. Brown	M. Wilder	Buffalo, N. Y.
Rockford, Rock Island & St. Louis	R. D. Grant		Beardstown, Ill.
Rock Island & Peoria			Rock Island, Ill.
Rutland	N. L. Davis	M. M. Crooker	Rutland, Vt.

S

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St. Croix & Lake Superior			New-York City.
St. Lawrence & Ottawa	Calvin Dame	Calvin Dame	Prescott, Canada.
St. Paul & Pacific	C. N. Parker, Jr.	C. N. Parker, Jr.	St. Paul, Minn.
St. Louis & Iron Mountain	O. A. Haines	Oscar Doolittle	Carondelet, Mo.
Sandusky, Mans. & Newark		Charles Scoeby	Sandusky, Ohio.
St. Joseph Valley			Kalamazoo, Mich.
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St. Paul & Sioux City	Jas. G. Butterfield		Shakopee, Minn.
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Stonington & Providence	J. H. Anderson	J. H. Anderson	Providence, R. I.
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Sioux City & Pacific	Charles Foster	J. R. Dow	Missouri Val., Iowa.
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Sheboygan & Fond du Lac	J. H. Erwin	J. H. Erwin	Sheboygan, Wis.
Sullivan & Erie			Tonawanda, Pa.
Syracuse & Binghamton, N. Y.	B. G. Merrill	B. G. Merrill	Syracuse, N. Y.
Sycamore & Cortland			Sycamore, Ill.
St. Louis & South-Eastern	C. B. Salisbury		Mt. Vernon, Ill.

* Superintendent of Motive Power and Machinery.

Railroad.	Master Mechanic.	Master Car-Builder.	Residence.
T			
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Texas & New-Orleans	R. B. Baer		Houston, Texas.
Tennessee & Pacific	William McKeand	William McKeand	Nashville, Tenn.
Toledo, Wabash & Western	W. F. Ray		Fort Wayne, Ind.
Toledo, Wabash & Western	T. G. Gorman	David Hoit	Toledo, Ohio.
Toledo, Peoria & Warsaw	A. H. De Clerq	R. M. Hemphill	Peoria, Ill.
Troy & Bennington			Troy, N. Y.
Troy & Boston	Foster Church	R. V. Coon	Troy, N. Y.
U			
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Utica & Black River	John Bailey	David James	Utica, N. Y.
Utica, Chenango & Susquehanna	C. H. Brown		Utica, N. Y.
V			
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Vicksburg & Meridian	Jas. B. Brown		Vicksburg, Miss.
Vineland			Vineland, N. J.
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Vermont & Massachusetts	W. F. Kenney	Jacob Marsh	Fitchburg, Mass.
Vermont Valley			Rutland, Vt.
W			
Washington, Alex. & Georgetown			Washington, D C.
Warwick Valley			Warwick, N. Y.
Wicomico & Pocomoke			Berlin, Md.
Wilmington, Charlotte & Rutherford	W. A. Gill	Thomas Myers	Laurenburg, N. C.
Wilmington, Columbia & Augusta	George Hall	W. J. Calais	Wilmington, N. C.
Winchester & Potomac			Winchester, Va.
Westchester & Philadelphia	P. C. Clark	P. C. Clark	Philadelphia, Pa.
Wilmington & Weldon	John F. Devine	John F. Devine	Wilmington, N. C.
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Western Maryland	R. V. Dohoney	J. H. Nussear	Union Bridge, Md.
Winona & St. Peter	F C. Ford	H. L. Preston	Winona, Minn
Western North-Carolina	E. H. Marsh	E. H. Marsh	Salisbury, N. C.
Western R. R. N. C	M. W. Atkinson	M. W. Atkinson	Fayetteville, N. C.
West-Feliciana	R. C. Brower		Woodville, Miss.
Whitehall & Plattsburg			Plattsburg, N Y.
Western & Atlantic	James Mullin	John Sherman	Atlanta, Ga.
Worcester & Nashua	George H Griggs	George H. Griggs	Worcester, Mass.
Welland	William Wells	William Pay	St. Catharine, C. W.
Washington & Ohio	Nathaniel Hayes	Joshua Hamson	Alexandria, Va.

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Brill & Son	Philadelphia, Pa.
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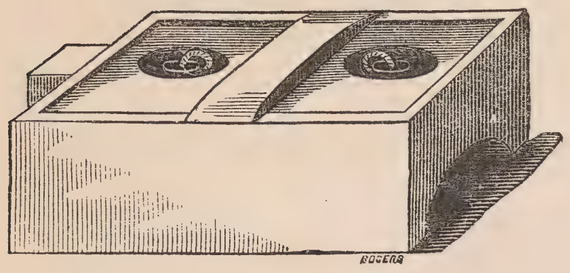

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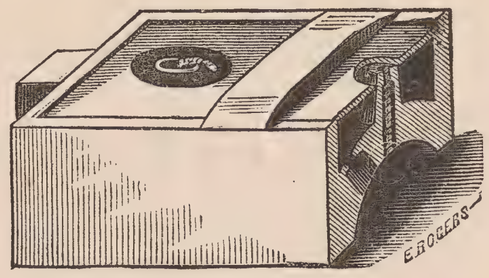

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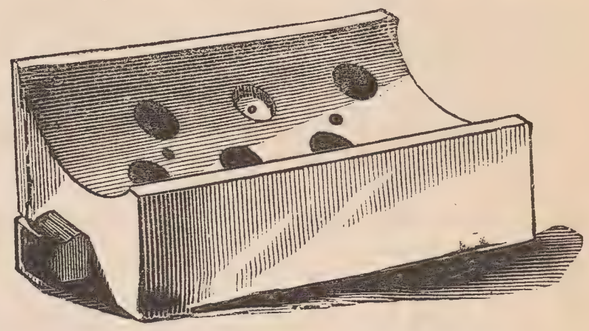

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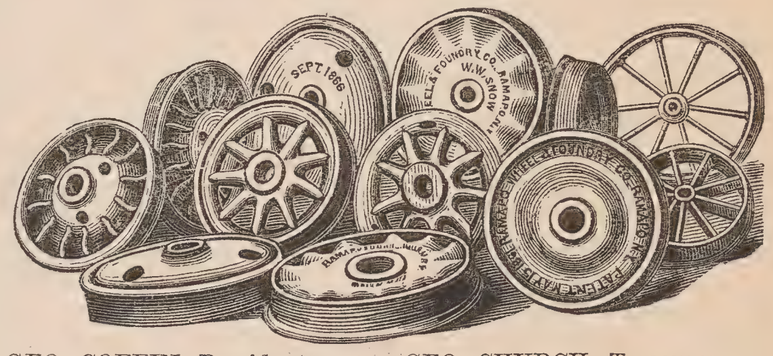

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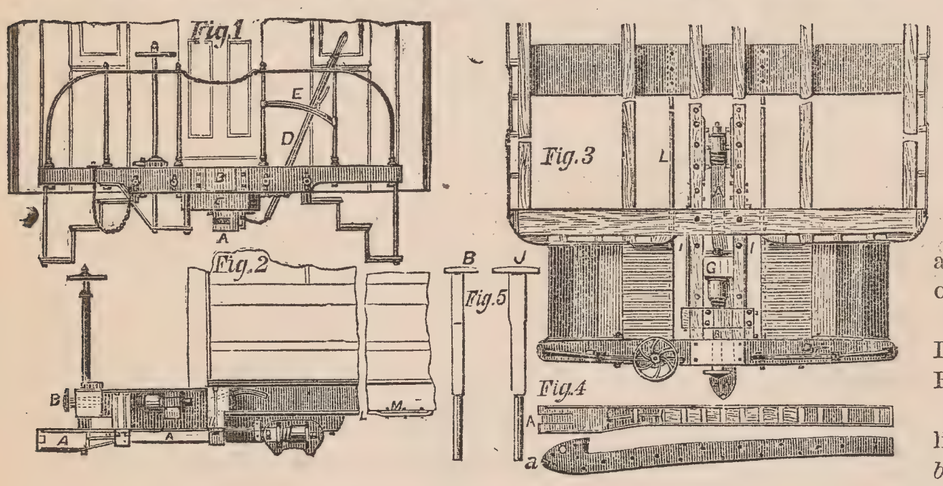

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DESCRIPTION.

Figure 1 is an elevation; Figure 2, a longitudinal section; Figure 3, a plan of an end of a car to which the arrangement has been applied; and Figures 4 and 5 show top and side views of the "Hook" and "Buffer," drawn on a larger scale than that of Figures 1, 2, and 3.

The letters refer to the same parts in all the figures. A is the coupling "Hook," B the "Buffer," C the "Stop," D the "Lever," E the "Quadrant Ratchet," F the "Truss Beam," G the "Spring Beam," H the "Suspender Beam," I the "Upward Trusses," K the "Main Spring," L the "Downward Trusses," and M the "Bolster."

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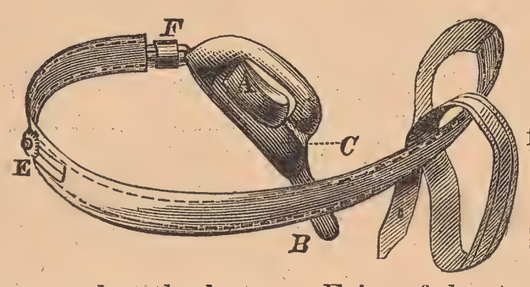

C, Groove for Spermatic Cord.

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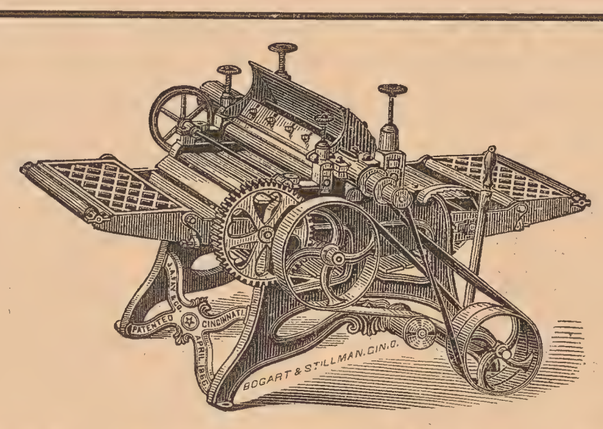

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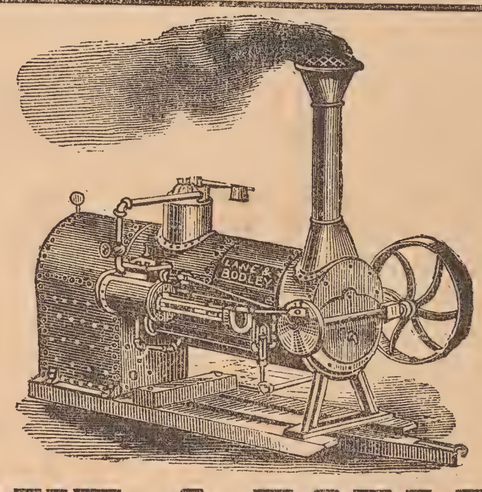

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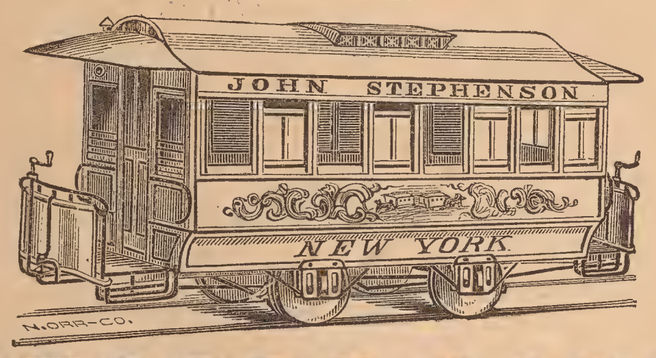

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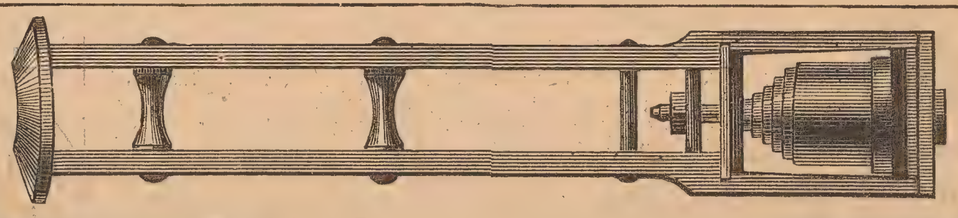

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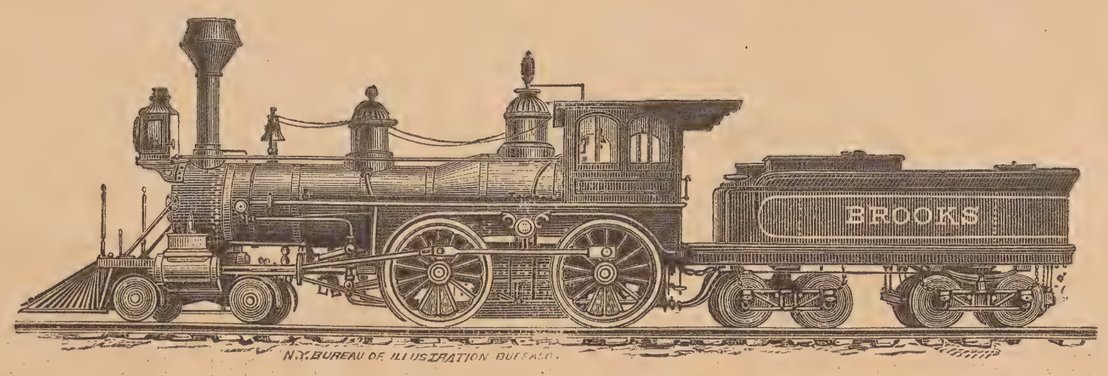

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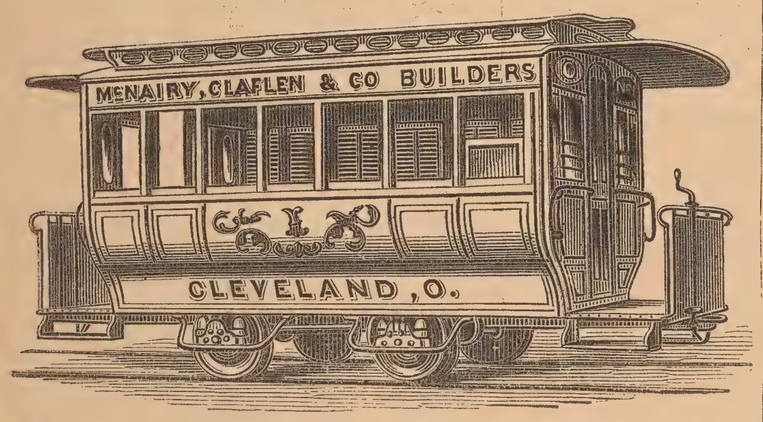

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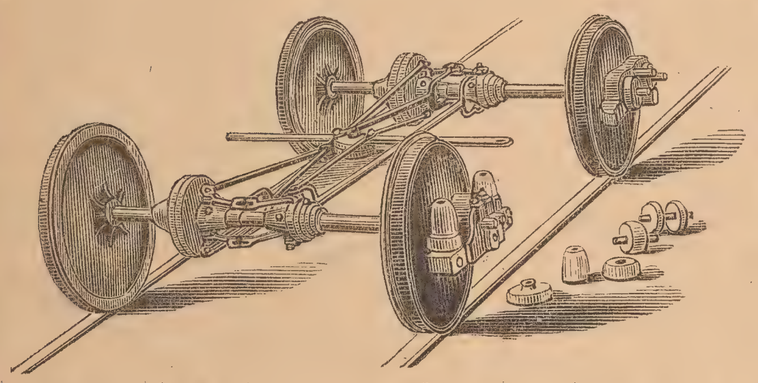

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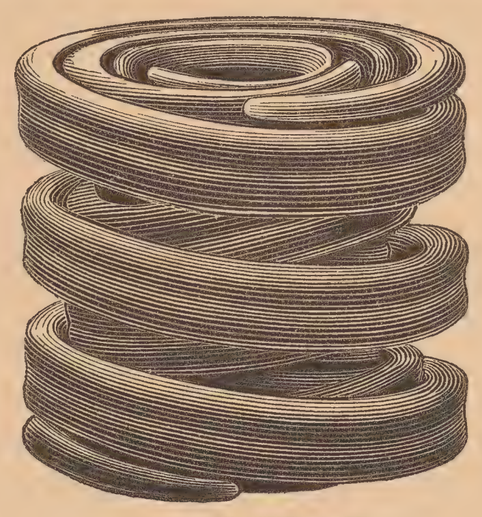

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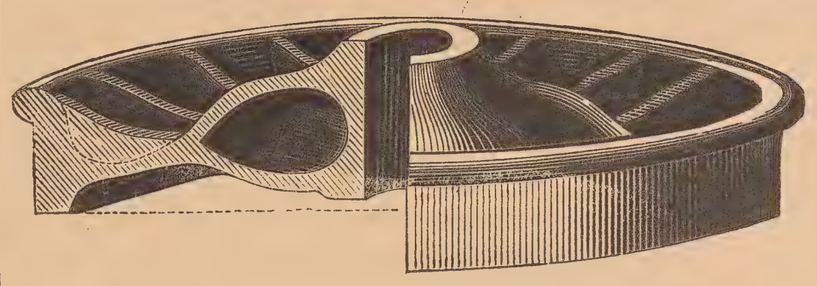

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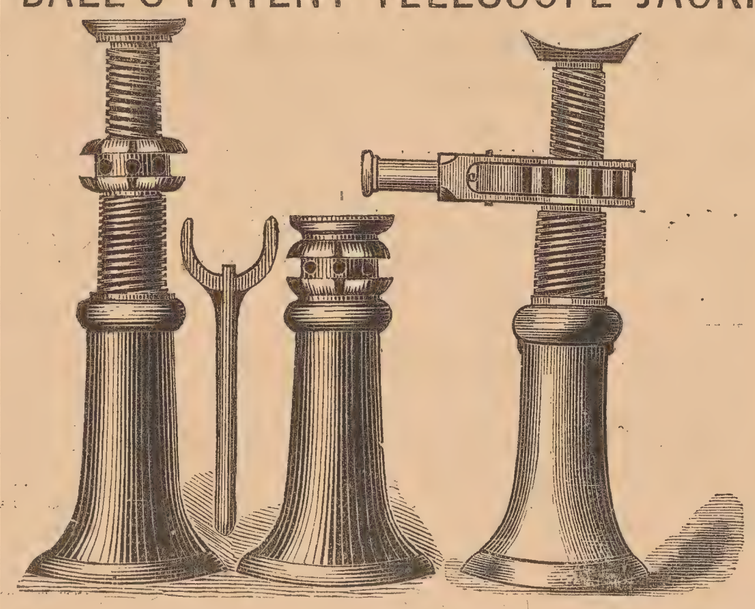

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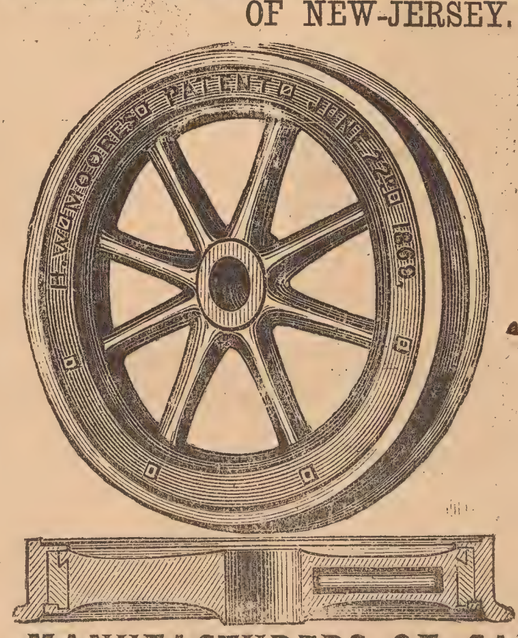

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Vol. II. No. 4. } OCTOBER, 1871. { 50 Cents per Annum. Single Copies, 10 Cents.

Master Mechanics' Association.

THE fourth annual meeting of this association was held at the Galt House, in Louisville, on the 13th ultimo. Upward of fifty members were present. Mr. H. M. Britton, of Cincinnati, President of the Association, delivered an address on taking the chair, reviewing the history of the association from its first organization in 1868, and the progress it had already made in promoting the object of its formation; and commenting on its present prosperous condition, and prospects of future usefulness in furthering the interests of the great railway interests of the country.

The first business in order was the receiving of reports of committees appointed at the last annual meeting, upon the various subjects assigned to them. The first report was presented by Mr. S. J. Hayes, of the Illinois Central Railroad, on the subject of

BOILERS AND BOILER EXPLOSIONS.

It was quite lengthy, and embraced the experience of several of the leading railways of the country, as to the relative merits of iron, copper, and steel plates, and recommended the use of steel for furnaces, and iron for the shell of boilers. The committee think there would be material advantage in constructing the cylinder parts of boilers of single sheet, provided they could be manufactured with a uniform degree of excellence. Many valuable data were attached to the report in relation to the tensile strength of iron and steel.

Mr. H. A. Towne, of the Hannibal and St. Joseph Railroad, reported on the subject of

BOILER INCRUSTATION.

The report refers to the imperative necessity of purifying the water by decomposition or infiltration, before it is placed in the boiler. Process suggested by Mr. Hayes, of the Illinois Central, possessing very valuable features, and statistics from the New-York Central, showing cost of fuel on western division to be $20,000 more than on the eastern division, by reason of impurities in the water.

A resolution was appended to the report, that the secretary be authorized to correspond with superintendents and master machinists of railroads where water of impure quality is largely used, with a view to experimenting upon the plan recommended by Mr. Hayes, or some other plan of purifying the same, and report at next convention. It was shown that about seventy per cent of repairs of boilers are attributable to the use of bad water.

Mr. Philbrick sustained the report in a few remarks, exhibiting a fragment of a boiler-head showing the extent of incrustation from impure water.

Mr. Chapman also added his experience in this regard. He had found boilers filled with mud, which, unless removed, very soon becomes hard. Of two boilers he had, last winter, one of them "blown out" every two weeks, while the other only once in six months. Last winter, he had the flues of the former taken out, and found the boiler comparatively free from mud. He was strongly in favor of the "blowing-out" process often.

Mr. Dodge was glad to know that some elaborate experiment was on foot to precipitate the impurities of water used in boilers, and referred to the eastern and western division of the New-York Central, the latter of which cost $27,000 more per year for fuel than the former, on account of the difference in water used on either division.

Mr. Ham, of the New-York Central, said that arrangements were being made to secure soft water also on the western division of his road. Every twelve months, where "hard water" was used, the boiler became so completely filled with mud that they had to cut the flues off each end. He had to take out from thirty to fifty flues every six months to clean out boilers.

Mr. Sellers, of Keokuk, Iowa, said his road, in using Mississippi River water, found great difference. He had to take out from thirty to sixty flues, and work on the boiler, every five months, when that water was used, and find the boiler filled with mud. He thought the best plan for ridding the boiler of this muddy sediment was to put in blower-cocks, and blow off each day one gauge of water; with this, but little trouble was experienced. He thought this a desirable appliance to put to any engine, stationary or locomotive.

Mr. Hayes, on the subject of incrustation, said the State geologist of Illinois had reported that these water impurities could not be precipitated but by high temperature. The New-York Central Railroad report showed that it cost as much to precipitate foreign matter as to clean the boiler. If companies would use the experiments recommended, they would result in great benefit where they must use impure water. The talents of master mechanics combined had been taxed for ten years to get rid of the scale. The Baltimore and Ohio road used mountain water, and could run twelve months and not get as much mud in the scale of the boiler as in the West, where the water is impure, in one week.

Mr. Towne, of Hannibal, continuing the subject under discussion, thought it very dangerous to "blow-off" under pressure, in any way. In England, the mud-drum would frequently keep the boiler comparatively free from mud; but an increase could be prevented by blowing off the boiler, under pressure, by allowing it to cool, though it is seldom done. If increase of mud accumulates, it forms a white, pasty substance that could be removed with the broom and force-pump. Water should be filtered before going in the heater. When the water has a white, milky appearance, we may conclude that it is the result of lime or decomposition. He had found one fourth of an inch sediment in the bucket during a single night. The only safety lay in purifying the water. He indorsed the report of the committee, and the plan of Mr. Hayes, and thought it ought to be thoroughly tried.

Mr. Hayes agreed to what Mr. Towne said of blowing-out engines. But what is to be done on a road whose power is taxed to its utmost? An engine comes in at ten P.M., and must start out at six in the morning. Hence, there is no time for letting the water out. If the boiler could be allowed to stand one night, and be washed out in the morning, most of the sediment might be forced out. But most roads had not enough engines, and so long as this deficiency exists, we must continue to have mud.

Mr. J. Losey, of the Louisville, Nashville, and Chattanooga road, reported on

BOILER EXPLOSIONS.

The experience of the past year serves to confirm facts elicited in the former report. The majority of the explosions that occur are attributable to bad material, neglect in construction, ignorance, and incompetency in management of roads. An addition of trains in construction and operation would add greatly to the safety of the traveling public. Ordered to be filed.

On the subject of explosions, Mr. Setchel thought that in cases where a boiler cracks after being in service only a few months, it could be patched to advantage. If the iron is not good, the sheet should be thrown away. But if merely corroded at the one edge of the seam, is it economical to patch or take out the whole sheet? He thought the former. In case of a fire-box, a new one might be put in. Roads changing from wood to coal show cracks immediately; and sometimes these engines could be patched and run a year.

Mr. Hayes remarked that there were cases where it was better to patch than to renew. In defect of manufacture of a sheet, it might crack in one week, and all the rest of the sheet be perfect, and, with patching, run ten years. Pieces of a boiler-plate that had been in use for fifteen years might be subjected to hydraulic pressure and pull in two, and still be good. Even after long use, unless there is deterioration in thickness, it may be as good as ever.

Mr. Boone said that the reason a boiler explodes, nine times out of ten, is that the engine runs too long, and the boiler depreciates in strength. In England, a boiler is discarded after running twenty years; while in this country they are kept on the track over thirty years. He had broken these old boilers and found them very brittle. A boiler leaks, it is carried into the shop and patched; it leaks again, is again patched, and so on for months and years, until no particle of the original boiler is left. It then explodes, and we have fine-spun theories as to the cause.

After a boiler is used twelve years, throw it away. There was no economy in keeping it longer. Even those that looked safe had been found to break under the stroke of a 1½-pound hammer after long use. He had never broken a fifteen-year old boiler whose iron was fit for any thing. He had never seen a steam-gauge that he would be willing to run two miles by. The steam-gauges in use may be correct for a year or

two, and may not for two days. A certain gauge he witnessed not long since indicated 110 pounds when he knew there were at least 150 pounds of steam on. Let us come down to hard facts and get new boilers.

Mr. C. E. Benton, chairman of the committee on

DEAD-WEIGHT,

reported that the experience of the past year affords no reason to change the opinions of last report. The "narrow gauge," many hold, is the remedy for getting rid of useless dead-weight; but the committee do not so consider it. Data of several "narrow-gauge" roads show that it is evident, if the seating capacity of the wider gauges was made more narrow, or reduced, they would necessitate less weight than the narrow gauge. In the seats and trucks are found material for reduction. It is desirable that changes should be made in harmony with the existing width. Changes should be first thoroughly tested. While track is being torn into ribbons, stockholders, superintendents, and the traveling public are grumbling.

All concur in the value of large boiler-space, especially in handling heavy trains. The great difficulty in reducing dead-weight seems to be in the large boiler. Lighter boilers, or lighter pots, are necessary to achieve the end in view. The plan of Mr. Forney seems to secure a greater percentage of adhesion and reduction of dead-weight. Should his theory of locomotive construction be well founded, it would seem to meet the requirements of the case.

Mr. F. A. Perrin submitted a report on

STEEL TIRES, WHEELS, AND AXLES.

The report contained voluminous statistics concerning the wear and mileage of steel tires for locomotives, showing the relative durability of those made by different manufacturers; also a record of the breaking of steel tires, of steel wheels and axles, and was rather unfavorable to the use of small axles for cars, tenders, and trucks, but favored the use of locomotive driving-wheels. Report filed.

Mr. Glass presented the following in this connection: Engine 26 was put on his track December, 1867, and run until March 1st, 1871, a distance of 130,694 miles, before tires were turned off. They were then in a much better condition than many running only six months. The tires were then turned off, or it could have run a year longer. Made by Firth.

Mr. Towne thought more steel tires were broken from shrinkage than otherwise. On his road none of Krupp's, Vicker's, and some others' tires had broken. We allow a five-foot wheel about the twenty fourth of an inch shrinkage.

Mr. Hayes allowed his tires the same shrinkage. Two of his cracked longitudinally fifteen inches, and are straight across; but it showed the tire was imperfect before being put on, and shrinkage had nothing to do with it.

Mr. Lander, of the New-Hampshire road, had made his report as perfect as possible; but he had sent questions to master mechanics, with request to answer by the first of August, and the time was too limited for full replies.

Mr. Glass said his engine, 26, ran twenty-two miles per hour. The track was fish-plated.

Mr. Ham, of the New-York Central, was called on to give a statement of the French tire used on his road. This was a good tire, running, often, 60,000 miles before turning. They were allowed a shrinkage of one hundredth part of an inch to the foot, invariably.

Mr. Sellers, of the Memphis and Charleston, had a statement of an engine on the Pennsylvania Central that run 153,000 miles without turning off. In the report the greatest run was 123,000. It did not state whose tire it was.

Mr. Lander did not think the report had any thing to do with the presentation of extraordinary tires. The basis of the report was a given number of miles run to an average wear.

Mr. Sellers thought more depended on the character of the road. In the South, where there were roads, if they got 50,000 miles they were doing well.

Mr. Setchel thought much, of course, depended on the circumstances of each case. He did not want the association to become an advertising medium for any particular tire.

INDICATORS ON ENGINES.

The committee on this subject reported that answers had been received from twenty-six master mechanics.

Mr. Boone thinks it advisable to place indicators on engines; thinks accidents caused, for most part, by excessive steam. In spite of men being discharged for violation of rules, they continue to do so. Indicators without a registering arrangement and correct time-card are useless. Temptation to make excessive speed would be removed, with an indicator to tell, as soon as a wreck occurs, the amount of steam. An apparatus of this kind was in existence, as shown by an article in *Harper's Weekly*. The degree of velocity is easily indicated by this apparatus, and is independent of the control of the engineer, and could be easily indicated to any one.

Mr. Pendleton reports, in answer to a communication from the committee, that he had no indicator of the kind mentioned.

Mr. Setchel approved of this new indicator. It was useful, also, in declaring the rate and speed of train; useful in case of accidents in showing speed of train, as men are always ready to swear in such cases that the train was going sixty miles per hour.

Mr. Gibbs also commended the consolidation engine, though he had no such instrument. It made one "pick" on the paper, on its surface, to every nine revolutions.

Mr. S. J. Hayes thought it not desirable to place speed-indicators on all engines, though one for every two or three would be useful.

Mr. Towne thought if an instrument could be constructed to indicate time, rate of speed, etc., and out of reach of the engineer, it would be valuable.

The committee call attention to an indicator patented by C. A. Linear, and commend it.

TIME OF HOLDING NEXT MEETING.

Mr. Johann, of St. Louis, made a verbal report, announcing that the committee had considered the question, and recommend the month of May as the proper time for meeting. Report received.

Mr. Wells moved that the constitution of the association be so changed as to read, "the second Tuesday in May," as the day of meeting, instead of the "second Tuesday in September," it requiring a two thirds vote to make the change. Carried unanimously.

Mr. Devine moved that the election of officers be postponed until the next annual (May) meeting. Carried.

LINKS, GUIDES, AND PINS.

Report of committee on the merits of steel for links, guides, and crank-pins, as compared with the best quality of iron, case-hardened. Had communications from thirty-two master mechanics. They think case-hardened iron better than steel for the purposes. The New-York Central has engines that have entire crank-motion made of case-hardened iron, which have run over five years without being taken up. Received and filed.

WATER AND HEATING-SURFACE.

Report of committee on "What proportion should the surface of the water in the boiler bear to that of heating-surface, and what amount of steam-space for a given heating-surface to insure the best results?"

The importance of extent consists in the facility for escaping steam. In case of locomotive boiler, it is useless to inquire what ratio, as the area can be no larger than a certain proportion, as the area of heating-surface is fixed. It is only determinable by experience. A large space for steam is desirable. Some of the disadvantages arising from small steam-space may be remedied. The larger the better. Excellent performance has been obtained from boilers when the area of the water-surface is from one fifteenth to one sixteenth of heating-surface.

STEAM-MACHINE RIVETING.

Report read and ordered on file. Work by machinery was long distrusted, but now it can be done better than by hand. They find hand-riveting not without objection; the violent hammering is injurious. Again, so much depends on the skill of the workmen that the results vary. The piston-machine was commended; as it was restricted in its movements a uniformity was attained. The heading is done on the cupping system, and could not spread or scatter. Rivets driven by the piston-machine show the hole well filled, and steam-machine riveting is superior to that done by hand.

LUBRICATING OILS.

Mr. Bergh reported that letters had been received from master mechanics representing twenty-seven different roads, but that the information derived from these was not sufficiently general to lead to a satisfactory conclusion. For a fast passenger-train lard-oil seems to be the most satisfactory in its results, while for a slow freight earth-oils appear the best, which should be heated to twenty-eight or twenty-nine degrees in winter. For lubricating cylinders tallow was the best adapted, although lard-oil was also used The system of steam lubrication had also been used with success. The use of plumbago was not sufficiently extensive to warrant its adoption, but it had been successful when employed.

CYLINDER AND STUFFING-BOX PACKING.

Reports had been received from thirty-six different master mechanics, of whom fifteen were in favor of steam, and the remainder of spring packing. The highest mileage obtained in the former had been 200,000 miles, and the lowest, 18,000; the highest in the latter had been 150,000 miles, and the lowest, 15,000. The former possessed the advantage of greater economy of construction; but the latter, although more costly, was so successfully used as to offset this, for reasons detailed in the report. Twelve of those reporting were in favor of hemp for stuffing-boxes, twelve for soap-stone, and eight for a combination of both. There had been no information obtained as to cylinder packing.

Mr. L. P. Dodge tendered his resignation as secretary of the association; which was accepted. Mr. J. H. Setchel, of the Little Miami Railroad, was chosen as his successor. A vote of thanks was tendered to Mr. Dodge, and the sum of five hundred dollars directed to be paid him for services for the past year.

By a vote of the association, Boston was designated as the next place of the annual meeting.

HONORARY MEMBERSHIP.

Mr. Grant suggested the propriety of admitting a certain number of scientific men, whose attainments might be of great advantage to the association, into honorary membership, for the purpose of preparing papers to be read at annual meetings of the association; to have all the privileges of members, except the franchise. A resolution, in accordance with the above suggestion, was, after some discussion, introduced and passed as follows:

"*Resolved*, That applicants of the above character shall be admitted to this association on the suggestion of three members, (five dissenting voices being sufficient to debar admission,) and not over twenty associate members shall be admitted to membership."

The following scientific gentlemen were then balloted for, and elected members of the association: M. N. Forney, *Chicago Railway Gazette;* Alexander T. Holly, of Troy, N. Y.; W. W. Evans, New-York; Gordon H. Nott, Boston; Prof. J. Lawrence Smith, Louisville; William B. Dement, Philadelphia; Coleman Sellers, Philadelphia.

Mr. Philbrick proposed requesting these gentlemen

to read papers on subjects appointed for their consideration.

Mr. Burke moved that the officers of the association should prepare, or cause to be prepared, with reference to these gentlemen, essays to be read by them or other parties at the next meeting of the association; which was carried.

COMMITTEE OF ARRANGEMENTS.

The following gentlemen, connected with roads terminating in Boston, were appointed a committee to make arrangements for the meeting of the association in that city, the second Tuesday in May next: John Thompson, Eastern Railroad; F. A. Waite, Boston and Maine, and George A. Coolidge, of the Fitchburg road.

The secretary was then requested to notify each committee of the subjects assigned for report, after which the convention adjourned to meet in Boston, Mass., on the second Tuesday of May, 1872.

The New Style Locomotive.

THE narrow-gauge locomotives, built by the Baldwin Locomotive-Works for the Denver and Rio Grande Railway, have been set up and tried on the line of that road near Denver, and are now in operation in the construction of the road. About three and a half miles of narrow-gauge track (three feet) had been laid out of Denver at last accounts, and upon this the small engines have been thoroughly tested. Immediately upon leaving Denver the track is laid to a temporary grade of one hundred and forty feet to the mile. Up this grade the freight locomotive pulled twenty of their four-wheeled flat cars loaded with railroad iron. The engine hauled this train without difficulty, stopping and starting readily with it on the grade. This engine has three pairs of drivers thirty-six inches in diameter, a "pony truck" in front, and weighs, in running order, 34,000 pounds.

The passenger-engine Montezuma (with two pairs of drivers and "pony truck," weight 25,000 pounds) drew a train of six passenger-cars at a speed of thirty miles an hour, making the time with ease. The engines ride well and steam freely. These statements are embodied in a letter from the General Superintendent and Chief Engineer Greenwood, who has charge of the construction and operation of the line.

A Novel Railroad.

A NOVEL tramway or railroad has been lately built in Turkey by an English engineer, the propelling power of which is not steam but animal, horses or mules being employed. A single rail is laid on sleepers, and the carriage has wheels in the centre on the same longitudinal line. Through the car runs a balancing-pole, the two ends of which, projecting three feet or more, are secured to saddles on the backs of mules. The animals will thus be one at each side of the load, instead of in front, as ordinarily. It would be impossible for the cart to turn over, because, in order to do so, it would have to force one mule to the ground and lift the other in the air, and, moreover, as the floor would only be six inches above the rail, an overtip would be of no account. All the weight in the cart, if evenly distributed, would bear upon the rail, and the animals, having no load on their backs, would be able to exert considerable traction power. The inventor not only suggests its employment for military purposes, but also for tramways in large cities; and says that, where space is very valuable, a horse or mule on only one side of the cart would be sufficient. In towns, on bridges, and other important places, the rail might, for a short distance, be dispensed with; and the passenger vehicles should be fitted with a small friction-wheel on either side, so that, if a horse should fall down, the balance of the carriage would remain undisturbed.

Testing Lubricating Oils.

A MACHINE for testing the relative value of lubricating oils has been constructed at South-Amboy, N. J., by Mr. A. H. Van Cleve, the general purchasing-agent of the Camden and Amboy Railroad. It is described as an experimental-shaft with journals 7 inches long, 6 inches diameter, (the size in use under the company's locomotive-engines,) and carefully fitted to brass bearings supported by cast-iron frames, secured to a suitable foundation. A spur-wheel attached to the centre of the experimental-shaft was geared to a pinion-wheel, on the centre of a driving-shaft, with its bearings also attached to the cast-iron frames.

A set of scale-beams arranged to apply any required pressure (within their capacity) to the lower half of the brass bearings were also accurately fitted to the cast-iron frames and foundation. The experimental-shaft was driven by a five horse-power oscillating-engine, at a given number of revolutions per minute, on each experiment.

The velocity was determined by a counter attached to the end of the shaft. The brass bearings of the experimental-shaft were kept at an average of 96° Fahrenheit, which was determined by thermometers inserted through them, to within ⅛ inch of the journals. An oil-cup was placed over each bearing, graduated to fractional parts of a gill. A thermometer, to determine the temperature of the oil when applied, was placed in each cup. The experiments proved that the consumption of oil varied with its temperature when applied. The quantity of oil applied per minute was varied at intervals, as was required to keep the bearings as near 100° Fahrenheit as possible, as abrasion of the metals took place when it rose above that point. The total consumption of oil, at the close of each experiment, was averaged with the number of hours occupied in making the experiment. The pressure upon the journals was varied for each kind of oil, as was necessary to preserve the uniform temperature of 96° Fahrenheit, at the required revolutions of the shaft per minute on each experiment.

Hence, the number of square feet of the journals' surface traveled per minute, the pounds pressure upon them, and the quantity of oil applied, determined the lubricating value of the oil. The method of applying the pressure by the scale-beams accurately indicated the power consumed by the engine to keep the shaft in motion during the experiments with each kind of oil.

A second series of experiments was made. (See Table No. 2.)

A shaft, with journals 6 inches long and 2¾ inches diameter, (the size now in use under the company's cars,) was fitted in place of the 6 inches diameter, and driven at a corresponding number of revolutions per minute, for the purpose of testing the value of car-box oils.

The experiments on each shaft were conducted with the same care, with corresponding results.

The accompanying table (No. 1) exhibits the results of several tests, from which it will be seen that winter sperm-oil, from three houses, sustained the heaviest pressure, and the best of them was taken as the initial of comparison for all others, and their per cent of lubricating value determined by it. The tests of mineral oils, and mixtures of animal and fish-oils with them, would not sustain an equal pressure with the sperm, when equal quantities of oil were applied, without rapidly increasing the temperature of the journals, and producing an abrasion of their surfaces.

The experiments as shown by table (No. 2) on car-box oils, with a shaft having bearings 2¾ inches diameter by 6 inches long, also proved that when the pressure on the bearings was made equal with winter sperm, it required from 100 to 400 per cent increase of oil to keep the temperature of the journals below 100° Fahrenheit. In no instance could the pressure on the car-shaft be raised to 8000 pounds, (with mineral oils,) it being the average pressure on an axle of a loaded coal-car. Hence, it is to be inferred that the expenditure of locomotive-power, and the cost of repairs on all loaded trains, must be in ratio with the quality of the lubricating material applied.

Experiments were made at varied velocities (see Table No. 3) with the same oils. The results proved that as the velocity was reduced the pressure could be increased, and the relative consumption of oil applied at equal temperatures was decreased in almost equal ratio.

The experiments were continued during a period of 14 months, on the oils purchased for the company's use; the following results are deemed sufficient for illustration:

TABLE No. 1.

With Locomotive Axle-Bearings, 6 inches in diameter, 7 inches long.

KIND OF OIL.	Revolutions of Shaft per min.	Pressure on Journals, lbs.	Temp. of Bearings—Fahr.	OIL. Applied per hour—Gills.	OIL. Per cent of Lubricating value less than Flanders's Winter Sperm.	OIL. Temperature Fahrenheit. Began to thicken.	OIL. Temperature Fahrenheit. Too thick to run.	OIL. Temperature Fahrenheit. Congealed at.	Horse-power of Engine consumed by each experiment.
Winter Sperm	131	7500	96°	.73	1.00	28°	26°	24°	3.55
Winter Sperm	125	7500	98°	.68	.04	30°	28°	27°	3.39
Winter Sperm	128	7000	96°	.82	.09	32°	26°	24°	3.24
Engine-oil	130	6633	96°	48	.12	34°	32°	30°	3.12
Engine-oil	130	6543	96°	.44	.13	19°	18°	8°	3.08
⅔ Winter Sperm, ⅓ Lard	129	5600	97°	.86	.26	...	...	...	2.61
½ Winter Sperm, ½ Lard	129	5260	97°	.84	.31	...	...	...	2.45
⅓ Winter Sperm, ⅔ Lard	132	4500	96°	.76	.40	...	...	...	2.15
Engine-oil	131	4125	97°	.82	.45	...	...	...	1 94
Mason's Sperm	127	4264	97°	.74	.45	...	...	...	1.96
Lard-oil	129	4000	98°	.69	.47	...	...	...	1.86
Engine-oil	129	3844	97°	.81	.50	...	...	...	1.77
Engine-oil	129	3500	97°	.75	.54	...	...	...	1.62
Engine-oil	125	3471	97°	.72	.56	...	...	...	1.56
Engine-oil, No. 2	125	1458	97°	.68	.81	...	...	...	0.66
Engine-oil	124	753	96°	.73	.90	...	...	...	0.34
Refined Mecca	127	266	98°	.71	.97	...	...	..	0.12

TABLE No. 2.

With Car Axle-Bearings, 2¾ inches in diameter, 6 inches long.

Winter Sperm	251	7000	95°	.25	.00	28°	26°	24°	3.18
Car-Box oil	237	4854	93°	.17	.35	17°	15°	10°	2.08
Mineral. Car-Box oil	225	4684	96°	.15	.40	31°	24°	12°	1.91
Mineral. Car-Box oil, No. 1	241	4014	96°	.16	.44	20°	18°	17°	1.75
Mineral. Car-Box oil, No. 2	240	4171	95°	.15	.43	13°	10°	.. °	1.81
Mineral. Car-Box oil, No. 3	245	4071	95°	.16	.43	16°	14°	13°	1.79
Mineral. Car-Box oil, No. 4	242	2500	95°	.18	.66	28°	26°	10°	1.09
Mineral. Car-Box oil, No. 5	243	4000	94°	.14	.45	15°	13°	10°	1.76

TABLE No. 3.

With Locomotive-Axle, at different velocities.

Winter Sperm	130	7000	97°	.40	.....	...	...	...	....
Winter Sperm	100	7200	94°	.26	.....	...	...	...	....
Winter Sperm	70	8000	94°	.18	.....	...	...	. .	....
Winter Sperm	60	9800	94°	.14	.....	..	...	...	....
Winter Sperm	130	7000	98°	.36	.....	...	...	...	....
Winter Sperm	100	7500	96°	.25	.....	...	...	...	....
Winter Sperm	70	8000	91°	.19	.....	...	...	...	....
Winter Sperm	60	9500	90°	.10	.....	...	...	...	....
Engine-oil	130	6500	96°	.24	.....	...	...	...	....
Engine-oil	100	7500	96°	.18	.....	...	...	...	....
Engine-oil	70	8000	92°	.14	.....	...	...	...	....
Engine-oil	60	9500	87°	.05	.....	...	...	...	....
Lard-oil	130	4000	98°	.31	.....	...	. .	...	....
Lard-oil	100	5000	95°	.18	.....	..	...	...	....
Lard-oil	70	5500	93°	.12	.....	...	...	...	....

Stick to the Fence.

FOR fifteen years, daily, at Stamford, Ct., a man has sat on the fence and watched every railroad train as it passed. He is probably trying to make up his mind if it would be safe to ride in the cars. Old fellow, you stick to that fence! If the top rail is sharp, turn it over, or put a cushion on it. Fit up a smoking apartment on the next panel, if you like, and rig a luxurious couch on the next one to that. Bring out your baggage, take a check for it, and hang it on a post. Buy a ticket, and punch it yourself. Ask yourself the distance to the next station, and get insulted. Secure, as your means will permit, all the luxuries of railroad travel, but don't get off that fence to enjoy them. So shall you die a natural death, and the good wife shall not expend the farm fighting the life insurance companies over your cold corpse. You're in the right of this thing, old rooster!

On Grinding Colors.

THE problem of grinding colors fine enough for car and carriage-painting has been a most difficult one to solve, although the operation is very simple. The entire grinding surface of a stone, if examined with a magnifying-glass, will be found to consist of minute projections and depressions. The particles of the material, when in the mill, are held in these depressions, while the projections rub or cut off small portions in the same manner as a file cuts off grains of iron or steel. Reduced in size, they are carried along the face of the stone, until, being caught in a smaller space, the operation is repeated. A continuous stream of particles so treated results in ground paint, which is more or less fine, as the operation is long or short, and as the grinding surfaces are in more or less perfect contact.

If, in this process, the paint becomes heated, we are met by an obstacle. If oil be employed as the vehicle, it becomes viscid and stringy, merely allowing the particles to be rolled about or carried along; or if Japan, then the turpentine evaporates, leaving the paint thick and hard—in both cases preventing that close contact of the stones just shown to be so necessary.

The finest ground colors ever produced heretofore have come from Winsor & Newton, of London, and are known as tube-colors. They are nearly all ground between a glass slab and muller, a process so slow that the united efforts of two skilled workmen can not produce more than five pounds per diem; and this so enhances the cost as virtually to put them beyond the reach of the car-painter.

Your readers are all familiar with what has been called the best mill in the world, and what a great step in advance was taken when the Harris mill was first introduced. In theory, this is a perfect mill, for it has the beveled surfaces which insure perfect contact; it is simple and compact, and as a hand-mill has no superior; but it requires to be frequently sharpened, when constantly used, by reason of the polishing of its surfaces from friction, and when rapidly driven by steam-power it presents another serious defect, namely, the over-heating of the material in which the paint is ground.

This brings us to a consideration of what is required in a perfect mill. The surfaces should be rough, in order to hold and rub down the particles of paint; and they should therefore be of a hard material, as stone or glass, which is not easily worn away or polished. They should be beveled or conical, as in the Harris mill, in order to insure perfect contact; for all experience has proved that it is impossible to keep the surfaces of two flat stones touching regularly, if one of them is revolving. Another point: All friction generates heat, and the closer the contact, the rougher the surfaces, and the higher the speed the greater will be the friction and the more heat there will be evolved.

From a consideration of the foregoing, it is obvious that the only method of producing a good color for car-painting, which shall be as fine as Winsor & Newton's colors, shall dry quickly, and flat perfectly, is to grind it in a mill that possesses all the above requisites of stone surfaces and beveled faces, and that can not heat, no matter how closely they are forced together. Cold water, from the ease with which it can be obtained, and its readiness to absorb heat, suggests itself as the means of obviating the worst difficulty to be found in the whole business of grinding colors; and when this is done the remainder is comparatively easy.

Such a mill has been invented and in actual use for the past two years. It is, once for all, a perfect machine. The water is applied to both stones, and a constant stream is kept flowing in such a manner as to carry off all the heat as fast as generated, without in the least interfering with the operation of grinding, while the paint flows out of the mill ground to the last degree of fineness. These mills are not yet for sale; so that this brief essay is not an advertising expedient to dispose of them. They are the result of a thorough knowledge of all the requisites for a good paint, backed by years of actual experience in grinding colors. The writer takes pleasure in communicating the above facts, as inaugurating a new era in the art of car-painting.

FRED. L. MILLER.

Steinard Steam-Brake.

A TRIAL test of the Steinard steam-brake was made on Tuesday, the 5th ult., on the Flushing and North-Side Railroad, in the presence of a large number of railway officials, engineers, etc. The train, consisting of an engine, tender, and six cars, left Hunter's Point about eleven o'clock A.M., and when a speed of twenty miles per hour was attained the engineer applied the steam-brake. There was no shock or bumping of the cars, but a gradual diminution of speed to six miles per hour, when the brake was released and the speed increased. This was repeated several times, until the train passed Flushing, and a long stretch of straight track was reached. The passengers then left the cars and stood at the side of the track. The train was then moved backward to the top of an up-grade, distant about one quarter of a mile. The train then moved forward and attained a speed of forty-five miles per hour, when, at a signal from the track side, steam was shut off and the brake applied; the train stopped without a jar in seven hundred feet. The test was repeated once with the same success. The passengers then entered the cars, the train ran back, and the test was again made with the same result.

The principle of the Steinard brake is the same as that of the Loughridge steam-brake. A cylinder and piston beneath the engineer's cab on the locomotive take steam by a pipe from the boiler. A short chain traveling over guide-wheels connects the outer end of the piston with iron rods so arranged beneath the cars that when steam enters the cylinder and the piston is forced back, the short chain acts directly on the rod beneath the cars, closing the brake-shoes against the wheels and checking the speed. The rods are connected between the cars by compensating bars, thus dispensing with the hook and chain formerly used. There is, therefore, no slack chain to be taken up when the brake is applied before an effect is produced. Another feature is that the pressure is the same on the wheels of the rear car as on the leading ones. The entire command over the speed of the train is thus placed completely in the hands of the engineer on the engine. He can increase or diminish the pressure on the wheels at will, thus avoiding the unintentional passage of stations and the application of too great and irregular power.

All who witnessed the tests seemed unanimous in their approval of the brake and its operation. The brake on each car being independent of the one behind it, if a car becomes detached, those ahead of it can be perfectly controlled. The brake has been placed on all the engines and cars of the Flushing and North-Side road, where it has been in successful operation since last April.

Careful Railroad Work.

THE New-Jersey Railroad Company every day run trains from the depot at intervals of less than ten minutes. An accident similar to the recent smash-up in Massachusetts has never occurred. A few days ago there were 45 special trains run over the road, in addition to the regular number, which is 104 per day. There were 3 excursion trains, with about 3000 passengers each, and others with 300 car-loads of peaches. The running of these trains in and out, year after year, without any accident of any kind, proves that it is possible for one fast train to follow another within a few minutes without danger, if the company's employees are skillful and obey orders. The greater number of the trains over the New-Jersey road run at the rate of 30 miles an hour.

The Miller Platform.

WE have been much interested to know, says the St. Albans *Messenger*, whether or not the colliding trains at Revere were equipped with the Miller platform, and have at length ascertained that one of them was. This was the Pullman train, on which not a single passenger was hurt. We believe that had the cars of the other train been similarly fitted out, not a life would have been lost, or at the worst but very few. This platform, as we have more than once explained before, is constructed so that the buffers are on a line with the solid work, the sills and other strong timbers of the cars, instead of below it, as in the old method, so that the concussion comes in a straight line and is effectually resisted, whereas in the old method it comes in a crooked line, and, like driving a crooked nail, doubles up the line by raising one car and driving it through another. When the engine of the Pullman train went rushing on it met nothing but the old sham. Let its own solid works have come in contact with the equally solid works of a car, and it may well be doubted if there would not have been a recoil instead of the fearful havoc there was.

Indeed, we have in mind a precisely similar case—a rear collision—where there was even greater violence than in this, and yet the Miller platform saved the train. It was stopped by a coal-train, on the 9th of October, 1866, and while standing on the track was run into in the rear by one of the heaviest engines on the road, with coal train attached, running at time-table speed. The conductor in his report says,

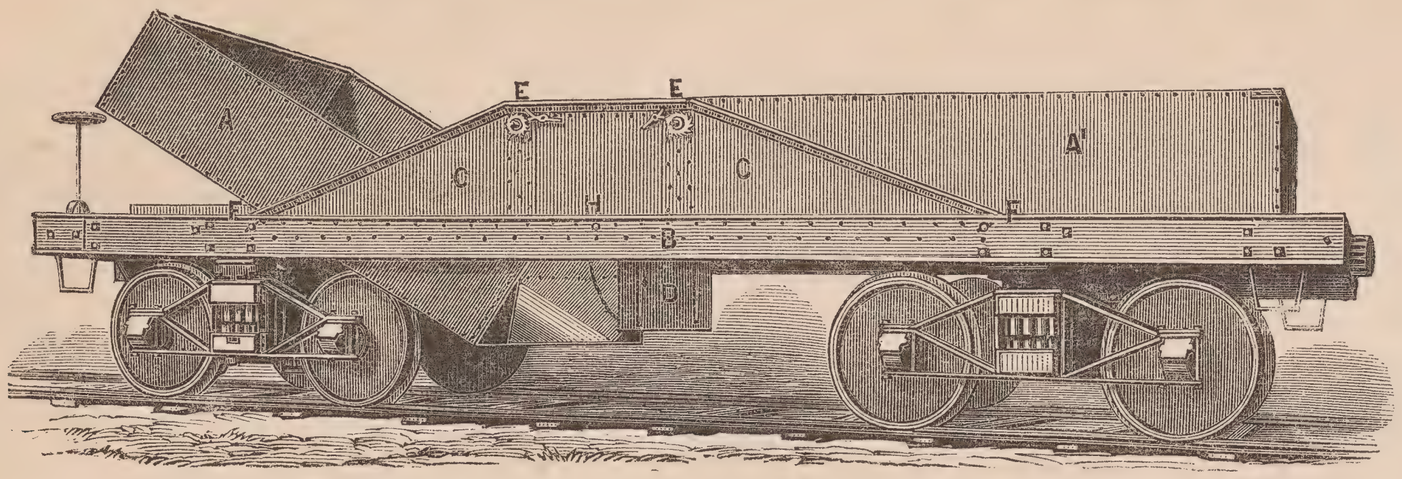
"The rear of my train was sleeping-coach No. 27, full of passengers, which, with the others, was equipped with the Miller platform, couplers and buffers, and which successfully stopped the said colliding coal-train, and saved my train from damage. The momentum, or the sudden checking of it, was so great that the colliding engine was thrown from the track, and the pilot, head-light, and bumper of the engine broken off.

"I make this report as a *matter of duty*, and have no hesitation in saying that the Miller platforms saved my train and passengers from damage, which, had the rear coach been equipped with the ordinary platforms, must inevitably have been very serious."

A New Car-Wheel.

A NEW car-wheel, under the patent of I. B. Tarr, is being manufactured at the Fairhaven (Mass.) Iron-Works, and it is proposed to establish works especially for the production of the new wheel in that vicinity. The superiority claimed consists in greater strength, lightness, and smoothness of the tread. The process of manufacture is described to be substantially as follows: The melted iron, after being poured into the mould, is subjected to a pressure of many tons by means of a hydraulic press. All the gases are thus driven off and the iron is rendered more compact, homogeneous, and free from air-bubbles, beside being forced into every part of the mould. The wheel comes out perfect in form, and of uniform density and strength. This process, as applied to iron, is precisely similar to that mentioned by Bessemer in his address before the Iron and Steel Association of England, published in our columns some time since, as producing the happiest result in steel. It is, moreover, used elsewhere in this country for the production of particularly fine and sharp ornamental castings for door and other fixtures. Casting under pressure is not a novelty, although its application to car-wheels may be, and is likely to prove, advantageous to product.

PRESIDENT GARRETT, of the Baltimore and Ohio Railroad, states that in view of the late alteration of gauge on the Ohio and Mississippi Railroad, arrangements are now in progress for running Pullman sleeping-cars, without change, between Baltimore and St. Louis.



Kirkwood & Merrington's Coal and Coke-Car.

Patent Coal and Coke-Car.

THE above cut, taken from a photograph sent us by the Pittsburg and McKeesport Car Company, represents Kirkwood & Merrington's patent coal and coke-car, of which we published a brief notice in our last issue. The superior advantages claimed for this car are set forth in the following extract from the company's circular:

"The bed being composed of two wrought-iron boxes balanced on the trucks, and dumping toward the centre, the load is equally distributed, and can be discharged instantly without extra labor, by opening the guards. Dispensing with the hopper as used in the ordinary car, the capacity is increased at least one third. Being constructed on the plan of a gondola or flat car, the bed made of iron with shallow sides, it supersedes all other cars in use where it is necessary to unload with a shovel. It adapts itself, in fact, to every requirement of our coal and coke trade in the way of transportation, where railroads are the medium."

In explanation of the cut, we would say that A A¹ represent the two boxes, the sides of which are made of one eighth, and the bottoms of three sixteenth inch sheets, bound by angle-iron and braced by side-plates at point of box, which throws their load between the rails. The boxes are balanced on hinge-rollers F F, which hang immediately over the trucks. The gunnel B and stationary truss C are made of channel bridge iron, or oak wood. The doors D D are hung on the bar H, and when open fall together, and when closed by the ratchet-rollers E E, they are made to underlap their respective boxes, so as to hold them up in the position of A¹. Safety-chains are put on the end of the boxes in connection with the end timber, to guard against accident in case the rachets should become detached. To unload the car, the safety-chains are first loosened; then, upon throwing the ratchets open, the doors fall and break the arch of the load, and its fall throws the boxes over balance toward the centre, thus discharging the load.

The magnitude of the coal-trade on our railroads is such as to require a car for transportation that will lessen the present cost of delivery, and the fact that the above-described car is destined to take the place of the hopper-car for coal, and the gondola for ore or freight, is a matter of great importance in the economy of rolling stock. The suitability of the car for ballast or gravel is a feature to which the attention of railroad men is invited. Its capacity as a gondola is 300 bushels of coal, and its weight less than that of the ordinary car. It can be transformed into a coke-car by an extension in the height of the iron sides, or by the addition of wooden side-boards and standards.

The Pittsburg and McKeesport Car Company have the exclusive right to manufacture these cars, and may be addressed for further information, or for an excellent card photograph of the same. This company has already received extensive orders for their manufacture, and also for changing the common hopper and gondola-cars into the new style, and their general adoption at an early day in every part of the country is confidently anticipated.

Correspondence.

Narrow vs. Broad Gauge.

TORONTO, ONT., Sept. 15, 1871.

EDITOR OF THE NATIONAL CAR-BUILDER:

DEAR SIR: I observe, in the last number of your valuable journal, that the gauge question is attracting the attention of parties interested in the construction of railroad-car stock; and feeling that any information bearing upon the subject will be acceptable to your readers, I append below a statement, showing the results accomplished by Messrs. William Hamilton & Son, car-builders at this place, as shown by cars they have already built and are now building, four feet eight and a half inch gauge, for the Great Western Railway of Canada, and three feet six inch gauge, for the Toronto and Nipissing Railway:

GREAT WESTERN PLATFORM-CARS,
(4 ft. 8½ in. gauge.)

Dimensions, 32 by 8 ft. 6 in.; area, 272 ft.	
Cost per foot of area	$1.85.
Carrying weight	20,000 lbs.
Dead weight	14,000 lbs.

TORONTO AND NIPISSING PLATFORM-CARS,
(3 ft. 6 in. gauge.)

Dimensions, 32 ft. by 8 ft.; area, 256 ft.	
Cost per foot of area	$1.75.
Carrying weight	20,000 lbs.
Dead weight	9,800 lbs.

GREAT WESTERN RAILWAY BOX-CARS,
(4 ft. 8½ in. gauge.)

Dimensions, 30 by 8 ft. 6 in.; area, 255 ft.	
Cost per foot of area	$2.58.
Carrying weight	20,000 lbs.
Dead weight	16,000 lbs.

TORONTO AND NIPISSING BOX-CARS,
(3 ft. 6 in. gauge.)

Dimensions, 30 by 8 ft.; area, 240 ft.	
Cost per foot of area	$2.46.
Carrying weight	20,000 lbs.
Dead weight	12,000 lbs.

Now, it will be observed that the difference in the two gauges stands thus: Suppose twenty cars to be a train-load, the capacity of each car being the same on both gauges, namely:

GREAT WESTERN PLATFORM-CAR,
(4 ft. 8½ in. gauge.)

20 cars, 20,000 lbs. load each	400,000
20 cars, 14,000 lbs. dead weight	280,000
Weight hauled	680,000 lbs.

TORONTO AND NIPISSING PLATFORM-CAR,
(3 ft. 6 in. gauge.)

20 cars, 20,000 lbs. load each	400,000
20 cars, 9,800 lbs. dead weight	196,000
	596,000 lbs.

Showing a difference in dead weight, in a train of twenty platform-cars, of 84,000 lbs. in favor of the 3 foot 6 inch gauge, and in the same proportion for box-cars, not to mention other advantages in favor of the narrow-gauge, such as less friction in passing curves, and carrying a load steadier and with greater safety, in consequence of the cars being considerably lower than those ordinarily used.

There are other points deserving of notice in connection with this subject, but which I will defer for a future letter, with the remark that the great object to be attained is to reduce the dead weight so much complained of, and still carry the same amount of paying freight with safety on each narrow-gauge car, which object has been accomplished, as I have demonstrated by the foregoing statement.

Yours, etc., CAR-BUILDER.

Our correspondent has omitted to say whether the narrow-gauge cars are as strong, and whether they are intended to run at the same rate of speed, as those for the four feet eight and a half gauge—points of importance in a comparison of this kind.—ED. CAR-BUILDER.

New Atmospheric Brake.

THE Pittsburg and Connellsville Railroad Company have been trying a new air-brake. It is called the Smith patent, and is claimed to be a better one than any now in use. A description of this apparatus, which, it is asserted, can stop in a few seconds a train of cars at full speed, is as follows:

On the right-hand side of the locomotive, fastened to the running-board, and under the inspection of the engineer, is an upright direct air-pump which is operated by steam supplied from the boiler, and pumps air into a reservoir hanging under the cab of the locomotive. This pump is entirely self-acting, and whenever there is a deficiency of pressure in the air-reservoir it commences working until the equilibrium is restored. Under each car of the train is a cylinder firmly bolted in such a position that its piston acts directly on the lever used for the ordinary hand-brake; but does not at all interfere with its use by hand.

The pressure of the air is conducted to these cylinders from the reservoir under the locomotive by a line of gas-pipe, three quarters of an inch in diameter, running the entire length of the train, and the connection with each cylinder is made from the main line with an elbow one quarter of an inch in diameter. From each end of the car the pipes are extended by three-ply rubber hose, which are connected when the cars are coupled together. Should a car become detached, the valves of the coupling immediately close, the brake continues applied, and the car is prevented from running back on a grade. An air-gauge placed immediately above the steam-gauge indicates to the engineer the quantity of pressure in the reservoir, and the management of the train is placed in the engineer's hands by means of a three-way cock.

At a recent trial of this brake on the Missouri Pacific Railroad, a train, 300 feet long, traveling at a speed of 34 miles an hour, was stopped in 20 seconds at a distance of 1000 feet from the point where the brake was applied. The train traveling at the same rate was subsequently stopped by brakemen with a hand-brake; but 45 seconds were required, and the cars continued in motion for 1750 feet.

THE station-masters and flagmen on the Fitchburg Railroad are now supplied with six-minute glasses. When a train passes the glass is turned, and if a train approaches before the sand has run out, a red flag is displayed, and the train is stopped. As soon as the sand has run out, the glass is turned again; and if a train comes before the sand is down, two flags, red and white, are shown, which indicate "proceed with caution;" afterward a white flag shows the track is clear.

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Editorial Announcements.

Correspondence.—*We cordially invite the coöperation of the railroad public in affording us the material for a good mechanical paper. Articles relating to rolling stock and machinery, by those practically acquainted with those subjects, will be gratefully received. All communications must be addressed to Vose, Dinsmore & Co., No.* 1 *Barclay Street.*

The name and address of the writer must accompany all communications designed for publication.

Advertising Rates.—*For one square, or one fifth of a column,* $5 *per month, or* $50 *a year. For half a square,* $3 *per month, or* $25 *a year. Larger advertisements by special contract.*

All communications in regard to advertising should be addressed to L. F. Dinsmore, *Post-Office Box* 4055, *New-York City, who is our agent for advertising, and authorized to make contracts, collections, etc.*

Engravings and Illustrations.

We would invite the attention of Master Car-Builders and others to the advantages to be derived from publishing in The National Car-Builder *engravings designed to illustrate the various features and details of car construction, and especially such improvements as can not otherwise be clearly presented. We will procure cuts to be made in the best manner from drawings or models that may be sent us, and charge only for the cost of engraving, inserting the same in our paper with suitable descriptive details, without charge. The cuts thus made by us, or that may be sent us for use in* The National Car-Builder, *will of course be returned promptly to the owner.*

Master Mechanics' Association.

We are indebted to the Louisville papers for the summary of the proceedings of this association which we print on our first and second pages. From this necessarily brief synopsis, it will be seen that a good deal of important business was transacted during the three days' session of the convention. The committees appointed at the last previous meeting submitted reports upon the various topics assigned to them, embodying the results of such inquiry and investigation as they have been able to make during the past year. Many of these topics are of special interest at this time to railway managers as well as to the general public. The official report of the proceedings, embracing the reports of the various committees and the discussions incidental thereto, will in due time be published by the secretary, when we shall give place in our columns to such portions of the same as may be deemed of interest to our readers.

We are glad to notice the admission of sundry gentlemen, as associate or honorary members, whose scientific repute and practical experience can not fail to render their advice and coöperation a valuable acquisition to the association.

A new constitution was also adopted. Mr. L. P. Dodge, late secretary of the association, tendered his resignation, which was accepted with a vote of thanks for his services, and Mr. J. H. Setchel, of the Little Miami Railroad, was chosen as his successor.

The next annual meeting will be held in Boston, on the second Tuesday of May next.

Car-Shop Notes.

The Lake Shore and Michigan Southern Road are building at their shops at Adrian, Michigan, six passenger-coaches fifty-five feet in length, exclusive of platforms, and ten feet in width. Their inside finishing will be very elegant and beautiful in the display of choice woods, including ash, mahogany, rosewood, and maple, so arranged as to exhibit the most effective contrast. Each car will be equipped with the Miller platform, Baker's heater with pipes running along the foot-rests under the seats, the Westinghouse atmospheric brake, and Howard's ventilators. They will also have triple floors, the upper one to be made of narrow pitch-pine plank, and the space between the others to be packed with felt. The company's shops at Adrian employ two hundred and fifty men; and besides building new passenger-coaches and repairing old ones, do all the repairing of freight-cars required on the Michigan Southern division. The shops are under the immediate superintendence of Mr. D. Sutherland.

The Cleveland shops of the same company are turning out one freight-car per day, besides rebuilding and repairing, and are about to commence the construction of two sleeping, and four baggage and mail-cars. These shops are in charge of Mr. James Withycombe, and under the supervision of Mr. John Kirby, the general master car-builder. Mr. F. O. Bray has been appointed to take charge of the Norwalk shops, and Mr. J. N. Mileham continues in charge of those at Buffalo.

The Adrian Car Company are finishing four handsome passenger-cars for the Chicago, Danville, and Vincennes Railroad, each provided with the Miller platform; and also three for the Detroit, Eel River, and Illinois Railroad. The company have contracts also for the building of six hundred and seventy-five freight-cars, of which five hundred and forty-seven are for the Lake Shore and Michigan Southern Road. They have also just completed one hundred for the Chicago, Rock Island, and Pacific Road.

The Toledo Car Company are building three hundred freight-cars for the Lake Shore Road; and the Toledo, Wabash, and Western Railroad are also building five hundred for the same road, and have just completed four fine passenger-coaches for their own line. They have also four more in process of construction. These cars are fifty-four feet in length, exclusive of the Miller platforms, and are intended to seat sixty-four passengers. They are very elegantly finished in solid ash and black-walnut, with gold stripes, the chandelier-lamps and basket-racks being in black bronze and gold to match. The seats and backs are crimson and green, and correspond with the prevailing color in the head-linings, which is also green. Mirrors are placed over every window and at each end of the car, in the decks, displaying in gold letters a tastefully designed monogram of the initials of the road. There are apparently no saloons visible at a first glance, but on closer inspection it will be found that the car has no less than four concealed by mirrors. Two of them have latticed doors, and contain Dripp's patent heaters, from which hot air is conveyed in zinc-lined passages the entire length of the car on both sides. There are registers at every seat, by which arrangement fresh air is introduced into the car, and warmed as it passes the heaters. Water-coolers are placed inside the saloons, out of sight, and connect with faucets on the outside. The deck-lights open from the bottom so as to exclude dust, and are of cut glass. The windows are of French-plate, with black-walnut sashes and arm-rests. The cars are constructed under the supervision of Mr. D. Hoit, the master car-builder of the Toledo, Wabash, and Western Railroad, at their shops in Toledo.

The Toledo, Wabash, and Western Railroad Company have already 170 locomotives in use; and the increase in business demands an increase in motive-power

Convention of Master Car-Painters.

The Master Car-Painters' Association opened their second annual convention at the St. Nicholas Hotel in New-York, on September 6th, and held three sessions, in which many important matters of business were taken up, including the following:

1. A new constitution was adopted, including many new features, which will probably add much to the unity of feeling in the society, and render its working capacity more effective.

2. The subject of priming-coats was discussed, and the views of the different painters were expressed as to the comparative advantages of lead and permanent wood-filling, the number of coats required, etc.

3. The subject of mineral paints for outside work was reviewed.

4. The subject of revarnishing cars was also discussed.

5. By far the most important item of business that came before the convention was the following resolution:

"*Resolved*, That a committee of three be appointed to draw up an address to the managers of the railroad companies in the United States, setting forth the many disadvantages under which the master car-painters labor, as the business is at present conducted. To be submitted for adoption at our next meeting."

The President appointed the following gentlemen to serve on this committee: Mr. Thomas H. Denny, of the Pennsylvania Central Railroad, Chairman; Mr. J. G. Burch, of the New-York Central Railroad, and Mr. J. Hill, of the Portland and Kennebec Railroad.

The foregoing matters received special discussion, and many others of vital interest to car-painters were touched upon.

The next meeting of the association was appointed to be held at Cincinnati, on the first Wednesday in September, 1872, and the following officers were chosen for the ensuing year:

President, Warren Bailey, of the Boston and Maine Railroad, Lawrence, Mass.; Vice-President, Thomas H. Denny, of the Pennsylvania Central Railroad, Philadelphia; Secretary and Treasurer, M. W. Stines, of the Boston and Albany Railroad, Springfield, Mass.

We would direct attention to the advertisement of Messrs. Morris, Tasker & Co., on fourth page of cover, manufacturers of boiler-tubes, steam, gas, and water-pipes, gas-valves, and new and improved machinery for coal-gas works.

The advertisement of the Lehicton Paint and Linseed-Oil Mills, at Easton, Pa., will be found on eighth page. The proprietor, Mr. C. E. Hecht, is prepared to furnish every description of materials for car-painting, including the celebrated car-colors for outside work, of which he is the sole manufacturer. These mills also have the sole agency of Smith & Dean's patent crystal enamel for coach and car-work.

Messrs. Nathan & Dreyfus, 108 Liberty street, New-York, are the sole manufacturers of Dreyfus' patent self-oilers for shaftings and cylinders, so widely known for their reliability and economy. A perfect lubricator for cylinders is also supplied by this firm. See their advertisement on twelfth page.

The *Chicago Railroad Gazette* of September 9th contains a superb engraving, on a large extra sheet, illustrating very elaborately the Westinghouse atmospheric brake.

The Rhode Island Locomotive-Works, at Providence, are turning out an improved freight-car, manufactured from channel-iron. It is thought these cars will take the place of wood, as they are lighter and much stronger.

The Lake Shore Railroad, extending from Buffalo to Chicago, and embracing over a thousand miles of track, is soon to be relaid with steel rails from end to end.

An Enormous Turn-Table.

GRADUALLY the arrangements for the expeditious moving of trains at the new depot at Forty-second street are being completed. The convenience of passengers and the easy handling of rolling-stock are two objects requiring much thoughtful consideration. The latest feature, shortly to be introduced, is a huge contrivance called the Harlem Railroad transfer-table.

This is a massive piece of iron-work, just completed in Paterson, N. J., and which will be located a short distance above the passenger depot. It is intended to transfer passenger-cars from track to track without the aid of locomotives or switches, and so to save a vast deal of time and confusion with the interminable switches; for by this machine a whole train of cars can be lifted out of the way, or a new train made up, in a few minutes, with little trouble and no risk of running off the track. It is a large frame-work of wrought-iron, riveted and bolted together, being seventy or seventy-five feet long, and wide enough to hold two cars. It will move on wheels, and have a steam-engine of ten to fifteen horse-power attached, by which it can be shifted at will. A track will be laid on each side, corresponding to the railroad-track in the depot, and the cars being run into the great gridiron, as it might be called, the machine will be moved sideways, and shift the car to whatever track may be desired.

The transfer-table is built entirely according to a draught, every rivet and bolt-hole and piece of iron being carefully described and numbered, so that the parts can be separated or put together without the aid of a machinist. Heretofore, an apparatus on the same general plan has been successfully worked at the Twenty-seventh street depot, for the lateral movement of cars, but on a scale quite paltry in comparison.—*N. Y. Commercial.*

Steam Street-Car.

THE Newark (N. J.) *Register* says that the Baxter steam street-car, built by Messrs. Bolen & Crane, after making a successful trip up and down Broad street, went up Market street to the depot of the Springfield avenue line, where it will be placed upon duty to carry passengers from the depot to Irvington. The trip can be made in four or five minutes each way, and thus do away with the necessity of horse-cars upon that end of the route. It is the intention of the company to run steam-cars at least as far as the court-house on Market street, if permission is obtained from the Common Council. Much interest was felt last evening to see how the car would get up the hill by the court-house, and great satisfaction expressed at the ease with which the ascent was made, although but forty pounds of steam were used, while the usual running power will be about one hundred and fifty pounds. Mr. Baxter, the patentee, and Mr. Paul Buchanan, President of the Springfield avenue line, accompanied the car upon the very successful trips last night.

Model Railway Management.

ON the Michigan Central road, for over sixteen years past, not a drop of blood has been drawn from man, woman, or child inside the cars, and just now the *modus operandi* is especially important. At all hours of the day and night there sits an operator in the Kalamazoo station, (midway of the line,) who receives telegrams from every train on the road the instant they enter or leave a station, so that he holds or starts them at will. His eye is literally on the entire line continually, making collisions next to an impossibility, and its immense single track quite equivalent, so far as safety is concerned, to the double-track roads. Its twelve and sixteen-wheel coaches, admitting of the breaking of almost any one of the wheels without disabling the truck, constitutes one also no small item in this aggregate of immunity from peril.

An Involuntary Ride.

A LOCOMOTIVE running as an extra on the Hudson River Railroad arrived at New-Hamburg from Poughkeepsie on Saturday, being stopped here by a telegram from that city in consequence of a singular and what might have been a tragic incident. Before the locomotive left Poughkeepsie four little boys who were playing about the depot, supposing it was a switch-engine, and only going a little way down the track, climbed stealthily upon the wooden guard just above the bumper on the rear of the tender. This guard is only six inches wide. Three of the boys sat down upon the guard, with their legs hanging over, and the fourth got astride of the iron link which protrudes from the bumper. They could not be seen by the men upon the engine, which moved off and continued increasing its speed until it was going at the rate of forty miles an hour, as was ordered. The boys were in a terrible situation. They dared not climb to the top of the tender for fear of losing their balance, and their cries were drowned by the noise of the engine. Over bridges and on the edge of precipices they were whirled, the tender surging to and fro, the dust filling their eyes and noses, and almost choking them to death, and entirely obscuring them from the view of the flagmen and trackmen who were passed. The locomotive was signaled at this place, Mr. James Signor having seen the boys on the rear of the locomotive when it left Poughkeepsie. The poor little fellows presented a sorry sight, as they were covered with dust from head to foot. The boy who was astride of the link was unable to walk when taken off, his legs being awfully chafed by the motion of the engine. The hands of the other boys were blistered terribly, and the blood oozed out from under their finger-nails, so tightly had they grasped the wood-work of the tender. They were nearly exhausted, and could have maintained their position but little longer, when they would have been probably instantly killed by the fall. They were taken back to Poughkeepsie, where the incident had become noised about, and a large crowd of people was in waiting at the depot to see them when the train they were on arrived.

A Newly-Invented Rail.

LETTERS-PATENT have been taken out for a new rail for railroads, which promises to do away with the continual rattle and jar of railroad travel. It is a continuous elastic **T** rail, and the inventor and those who have examined the principle of its construction claim important advantages over any rail now in use. The rail is in two sections, the upper section lapping over the lower, and they are fastened together by horizontal bolts. Between the sections is India-rubber packing, five eighths of an inch in thickness. It is thought the use of this rail will prove important in many respects, and be much cheaper in the end than those now in use. The upper section may be made either of iron or steel, and when worn out can be laid without disturbing the under section. A great expense will therefore be saved in relaying the track. The India-rubber packing, it is contended, will give the car an easy and almost noiseless motion, and prevent the sharp concussions which so frequently result in the breaking of the axles. The saving every year to the rolling-stock, it is claimed, will be an item of very great importance, and will commend the use of this improvement to all companies that study economy as well as safety. If the friction is lessened as much as engineers claim it will be by the adoption of this improvement, the duration of the rails will be greatly prolonged.—*Chicago Railway Review.*

MASTER Mechanics and others are requested to bear in mind that all communications for the Secretary of the American Master Mechanics' Association should hereafter be addressed to J. H. Setchel, M. M. Little Miami Railroad, Cincinnati, Ohio.

Miscellaneous Items.

WILLIAM E. SMITH has been appointed Master Mechanic of the North-Missouri Railroad shops at Moberly, Missouri.

C. F. JAURIET, who has heretofore had the title of "General Master Mechanic" of the Chicago, Burlington, and Quincy Railroad, assumed the office and title of "Superintendent of Machinery" on the 1st inst.; at the same time he was relieved from duty as Master Mechanic of the company's shops at Aurora, and E. T. Prindle, who has long filled the position of foreman of the locomotive shops, takes that place. Mr. Jauriet has served the company ably and faithfully for many years, and his promotion to a position where he can really supervise the motive power of the company, and not have his time absorbed by attending to details in the execution of the work, is well deserved and likely to profit the company. Mr. Prindle is a most excellent mechanic, who has the good will of his subordinates, and will be able to manage the very large force under his command at once effectively and agreeably. There are few better shops or better forces in America than those of which he has charge.

THE Detroit *Free Press* takes a gloomy view of things. It says, "No sane man will now set out on a journey by rail or water without first closing up all his business and arranging his papers so that his executors can find them, and kissing wife and children farewell. If he comes back all right, he can claim an interposition of Providence. If he comes back in pieces, his friends can claim that 'they told him so.'"

THE Hudson River and New-York Central Railroad Companies have both adopted a new style of car to be used in the transportation of petroleum. Oil will hereafter be transported over the roads in fire-proof tanks, made of quarter-inch boiler-iron, fastened upon platform-cars. They are filled from a dome at the top, the main hole in which is to be securely fastened when the tank is filled. In case of an accident, it will hardly be possible for the oil to escape; for even in case of severe concussion, no considerable quantity of oil would be likely to escape.

THE Rhode Island Locomotive-Works are making locomotives for the following roads: Great Western, Michigan Southern, Boston, Barre and Gardner, Charlotte and Augusta, Oswego and Midland, South-eastern Counties Railway, Chicago and Illinois Southern, Davenport and St. Paul, Boston and Providence, and Boston, Clinton, and Fitchburg.

A SET of paper car-wheels on one of the Pullman cars running to Jersey City have run over one hundred and sixty thousand miles of track, and worn out entirely one set of steel tires, which have been replaced. The ordinary wheels will only run sixty thousand miles.

THE change of gauge of the Louisville and Short Line Railroad, from five feet to four feet eight and a half inches, was commenced at daylight on Sunday, August 13th, and completed at seven o'clock in the evening of the same day.

THE Hannibal and St. Joseph car-shops built 500 freight-cars during the past year, and have just completed a contract for 150 flat-cars for the Burlington and Missouri River Railroad Company.

IN drilling wrought-iron, use one pound of soft soap mixed with a gallon of boiling water. This is a cheap lubricator; it insures working with great ease and clean cutting by the drill.

A FRENCH chemist asserts that, if tea be ground like coffee before hot water is poured upon it, it will yield nearly double the amount of exhilarating qualities. Another writer says that, if you put a piece of lump-sugar, the size of a walnut, into a teapot, you will make the tea infuse in half the time.

Facetiæ.

A TENDER mother being anxious to convey to the inquiring mind of her little child an idea of heaven, and the necessity of being a good boy, in order to obtain admission there hereafter, pictured to his imagination the happiness of the blest; and as an additional inducement for him to lead a correct life, said that he would be "like the angels, who have harps in their hands."

"Mamma," responded the urchin, wistfully gazing into his mother's eyes; "mamma, *if it makes no difference to God*, I'd rather have a Jew's harp."

The astonished parent rang the bell, and the nurse removed the polite little stripling to his crib.

"MRS. BRIGGS," said a neighbor, who stepped into the house of the former just as she was in the act of seating herself at the dinner-table, "have you heard of the dreadful accident?" "Why, no; what is it?" "Mr. Briggs has fallen from his wagon, and is killed." "Is it possible? Well, just wait until I finish my dinner, and then you will hear crying."

"YOU are from the country, are you not, sir?" said a dandy clerk in a bookstore to a handsomely dressed Quaker, who had given him some trouble. "Yes." "Well, here is an essay on the rearing of calves." "That," said Aminadab, as he turned to leave the store, "thee had better present to thy mother."

A YOUNG man having lost his watch-key, and being weary of looking for it, remarked that he supposed it had gone to h—l by this time. "Well," observed his grandfather, who was near by, "be contented, for you will be quite likely to find it again."

A MAN from the country, whose wife had eloped and carried off the feather-bed, was in search of them; not that he cared any thing about his wife, "but the feathers," said he, "them's worth forty-eight cents a pound."

"Do you think I shall get justice done me?" said a culprit to his counsel, "I don't think you will," replied the other; "for I see two men on the jury who are opposed to hanging."

A WESTERN paper reports the water so low in the Mississippi River that steamboats have to keep whistling to keep cows out of the channel. Many captains are having cow-catchers put on the boats. This is about the thinnest river yet discovered. They will have to melt ice pretty soon.

A COUNTRY exchange, in speaking of butter "brought in" to them as part pay on subscription, says, "The woman who made that butter brought to us last week ought to be more particular in the proportion of its ingredients; there was not enough hair in it to make a waterfall, and besides, it's of no use of your going bald-headed while butter is forty-five cents a pound."

A LITTLE girl sent out to hunt eggs came back unsuccessful, complaining that "lots of hens were standing around doing nothing."

SPURGEON thinks some ministers would make good martyrs; they are so dry they would burn well.

IT was rather personal in a California newspaper man to chronicle the purchase of a mule by a brother editor as a "remarkable instance of self-possession."

IT is said that in London "a child is born every five minutes." It must be a little unpleasant to the children to have the process repeated so often.

WHEN a man "puts up" at a Chicago hotel, he sees in the papers the next morning that he has "reined in his roaming valise at the Tremont."

A Terre Haute man refused to pay for the funeral notice of his mother-in-law. Some men would pay for such a thing with pleasure.

A Keokuk paper takes pride in mentioning that that city "is the 104th city in size in the United States."

A model bust—almost any patent boiler model.

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C. H. BASS,

EDITOR

Atlantic & Pacific Journal,

OFFICE, 24 ANN STREET,

NEW-YORK.

Car-Wheel Manufacturers.

Atlantic Iron-Works	Portsmouth, Va.
Barnum & Richardson Manufacturing Co.	Chicago, Ill.
Barney & Smith Manufacturing Co.	Dayton, Ohio.
Bass & Hanna	Fort Wayne, Ind.
Bailey, Howson & Co	St. Paul, Minn.
Davenport, Fairbairn & Co	Erie, Pa.
Dawson Manufacturing Co	Dawson, Ga.
Detroit Car-Wheel Works	Detroit, Mich.
Fulton Foundry Co	Cleveland, Ohio.
Gill & Bidwell	Allegheny City, Pa.
Green, D. P. & Co	St. Louis, Mo.
Harrisburg Car Manufacturing Co	Harrisburg, Pa.
Jackson & Woodin	Berwick, Pa.
John L. Gill	Columbus, Ohio.
Lobdell Car-Wheel Works	Wilmington, Del.
Missouri Car and Foundry Co	St. Louis, Mo.
Moore Elastic Car-Wheel Co	Jersey City, N. J.
Mowry Car and Wheel Works	Cincinnati, Ohio.
Ohio Falls Car Co	Jeffersonville, Ia.
Pettengill, Glass & Co	Cleveland, Ohio.
Quealey, W. J	Hannibal, Mo.
Ramapo Wheel & Foundry Co	Ramapo, N. Y.
Scoville, J. & N. C	Buffalo, N. Y.
St. Louis Car-Wheel Co	St. Louis, Mo.
Taylor Iron Works	High Bridge, N. J.
Thompson, Douglas	Bordentown, N. J.
Tredegar Company	Richmond, Va.
Toronto Car-Wheel Co	Toronto, Can.
Washburn, Hunts & Co	Jersey City, N. J.
Wason Manufacturing Co	Springfield, Mass.
Whitney & Sons	Philadelphia, Pa.
Woodbury & Company	E. Cambr'ge, Mass.
Wyoming Valley Manufacturing Co.	Wilkesbarre, Pa.

Locomotive Builders.

Baldwin Locomotive Works	Philadelphia, Pa.
Brooks Locomotive Works	Dunkirk, N. Y.
Danforth & Cooke	Paterson, N. J.
Dickson Manufacturing Co	Scranton, Pa.
Grant Locomotive Works	Paterson, N. J.
Hinckley & Williams	Boston, Mass.
Manchester Locomotive Works	Manchester, N. H.
Mason, William	Taunton, Mass.
McKay Iron and Locomotive Works	Jersey City, N. J.
Portland Company	Portland, Me.
Pittsburg Locomotive Works	Pittsburg, Pa.
Rogers Locomotive Works	Paterson, N. J.
Rhode Island Locomotive Works	Providence, R. I.
Schenectady Locomotive Works	Schenectady, N. Y.
Porter, Bell & Co. (light locomotives)	Pittsburg, Pa.
Taunton Locomotive Works	Taunton, Mass.

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Pure Raw and Boiled Linseed Oil, White Leads and Zincs, Colors, Putty, Varnishes, Japans, etc.

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Atlantic & Gulf	C. Collins	J. Sullivan	Savannah, Ga.
Alexandria & Fredericksburg			Alexandria, Va.
Alabama & Chattanooga	H. M. Smith	H. M. Smith	Chattanooga, Tenn.
Atlantic & North-Carolina	E. J. Clayton	E. J. Clayton	New-Berne, N. C.
Atlanta & West-Point	Wm. Rushton		Atlanta, Ga.
Atlanta & West-Point	R. D. Cole		Newnan, Ga.
Atlantic & Pacific	John Hewitt	John Hewitt	Franklin, Mo.
Allegheny Valley	G. W. Glass	R. Gunning	Pittsburg, Pa.
Androscoggin	Ira K. Russell	C. S. Greenwood	Farmington, Maine.
Adirondack			Saratoga, N. Y.
B			
Bay de Noquet & Marquette	John J. Murphy	H. D. Lyons	Marquette, Mich.
Bangor, Old Town & Milford	J. B. Peckham	John H. Brown	Bangor, Maine.
Bennington & Rutland	John Haining		Rutland, Vt.
Baltimore & Ohio	John C. Davis	John C. Davis	Baltimore, Md.
Bellefonte & Snow Shoe	H. D. Landis	H. D. Landis	Bellefonte, Pa.
Belvidere Delaware	R. McDowell	John Silvers	Lambertville, N. J.
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Boston & Albany	A. B. Underhill	W. E. Chamberlain	Boston, Mass.
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Boston, Clinton & Fitchburg	John Webster	Samuel Stevens	Fitchburg, Mass.
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Boston & Maine			Boston, Mass.
Boston & Maine		D. C. Richardson	Lawrence, Mass.
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Blossburg & Corning	O. C. Patchell	O. C. Patchell	Corning, N. Y.
Brockville & Ottawa	Joseph Cockfield	Joseph Cockfield	Brockville, Can.
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Burlington & Missouri River	G. Chalender	G. Chalender	Burlington, Iowa.
Burlington, Cedar Rapids & Minn	Wm. Swanston	Wm Swanston	Cedar Rapids, Iowa.
Buffalo & Washington			Buffalo, N. Y.
Boston, Hartford & Erie	I. E. Wiggins	Elias Pratt	Boston, Mass.
Buffalo, Corry & Pittsburg	Thomas Connell	Thomas Connell	Corry, Pa.
Buff. Bayou, Brazos, Colorado	E. Perry	M. Borst	Harrisburg, Tex.
C			
California & Pacific	O. R. Ford	D. Rutherford	Vallejo, Cal.
Camden & Amboy	F. B. Stevens		Hoboken.
	T. T. Kerr	E. Lockwood	Bordentown, N. J.
	Thomas Single		South-Amboy.
Camden & Atlantic	E. Collings	S. Wills	Camden, N. J.
Catawissa	A. J. Prescott	G. P. Fenstermacher	Catawissa, Pa.
Cape Cod	E. A. Walker	William Cannon	Hyannis, Mass.
Calais & Baring	Chas. W. Butler	Chas. W. Butler	Milltown, Me.
Catasauqua & Fogelsville	Thomas Evans	Chas. S. Holbach	Catasauqua, Pa.
Carrolton & Oneida	M. T. Wiggins		Carrolton, Ohio.
Charleston & Savannah	H. T. Calder		Charleston, S. C.
Chesapeake & Ohio	W. G. Freeman	J. N. King	Richmond, Va.
Cheraw & Darlington	D. W. Haines		Florence, S. C.
Champlain Trans. Co	H. T. Calder		Burlington, Vt.
Cheshire	F. A. Perry	F. A. Perry	Keene, N. H.
Charlotte, Columbia & Augusta	Robert King	J. Q. Leats	Columbia, S. C.
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Wiscon. Mad. & Mill. Divis	T. B. Tilton	Henry Hull	Fond du Lac, Wis.
Galena Division	R. W. Bushnell	Hugh Gray	Chicago, Ill.
Chicago & N. W. Iowa Division	C. C. Elliott	William Campbell	Clinton, Iowa.
Chicago & N. W. Peninsula Division	S. L Pierce		Escanaba.
Chicago & Alton	John A. Jackman	R. Reniff	Bloomington, Ill.
Chicago, Burlington & Quincy	C. F. Jauriet	W. W. Wilcox	Aurora, Ill.
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Chicago, Rock Island & Pacific	T. B. Twombly	B. K. Verbryck	Chicago, Ill.
Chicago, Michigan & Lake Shore	E. I. Reynolds		St. Joseph, Mich.
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Cleveland and Pittsburg	N. E. Chapman	N. E. Chapman	Cleveland, Ohio.
Cleveland, Mt Vernon & Delaware	J. W. Holloway	J. W. Holloway	Akron, Ohio.
Cincinnati, Hamilton & Dayton	William Cullen	W. H. Allison	Cincinnati, Ohio.
Cincinnati & Zanesville	Peter Green	D. J. Jewell	Lancaster, Ohio.
Cincinnati & Indianapolis Junction	J. H. Keith	W. W. Degnacey	Cambridge, Ind.
Cincinnati, Sandusky & Cleveland	John T. Beatty	William Earick	Sandusky, Ohio.
Columbus, Chicago & Indiana Central	(See Pitts. Cinn. & St. Louis)		
Concord	E. Studley	M. W. Dickerman	Concord, N. H.
Concord & Claremont	J. N. Lander	A. Langmaid	Concord, N. H.
Connecticut River	John Mulligan	R. Hitchcock	Springfield, Mass.
Contoocook River			Concord, N. H.
Conn. & Passumpsic Rivers	Horace Alden	Horace Alden	Lyndon, Vt.
Cumberland Valley	A. S. Hull	C. W. Nitterhouse	Chambersburg, Pa.
Cumberland & Pennsylvania	W. L. Jordan	J W. Sauerbach	Mt. Savage, Md
Central of Georgia	B. L. Boulineau	C. C. Millar	Savannah, Ga.
Central of New-Jersey	†T. W. Peeples	George Hackett	Elizabethport, N. J.
Central Branch Union Pacific	Wm. D. Rowley		Atchison, Kansas.
Central R. R. of Iowa	W. J. Ribley	W. J. Ribley	Eldora, Iowa.
Central Pacific	A. J. Stevens	Benjamin Welch	Sacramento, Cal.
D			
Dayton & Union	A. J. Keenan	J. F. Feicht	Dayton, Ohio.
Danbury & Norwalk	Charles A. Craig	Wm. W. Bedient	Danbury, Ct.
Dayton & Michigan	William Cullen,	W. H. Allison	Cincinnatti, Ohio.
Delaware, Lackawanna & Western	Walter Dawson	Robert McKenna	Scranton, Pa.
Des Moines Valley		R. E. Smith	Keokuk, Iowa.
Detroit & Milwaukee	B. Briscoe	B. Briscoe	Detroit, Mich.
Delaware & Hudson Canal Co	James Dickson	Thomas Orchard	Carbondale, Pa.
Dorchester & Delaware			Cambridge, Md.
Dubuque South-western			Farley, Iowa.
Dutchess & Columbia			Washington, N. Y.
E			
Eastern		J. P. Somerby	Salem, Mass.
Eastern	John Thompson		East-Boston, Mass.
East-Tennessee & Virginia	Jos. Armbruster	Jos. Armbruster	Knoxville, Tenn.
East-Tennessee & Georgia	Eli Hixon		Knoxville, Tenn.
East-Pennsylvania	J. M. Geary	Samuel Reeves	Reading, Pa
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Erie Railway	James B. Gregg		
Erie Railway	H. L. Brown	C. A. Smith	Jersey City, N. J.
Erie Railway	M. E. Brown	M. Wilder	Buffalo, N. Y.
Erie Railway	W. E. Cooper	W. E. Cooper	Hornellsville, N. Y.
Erie Railway		W. E. Rutter	Elmira, N. Y
Evansville & Crawfordsville	John L. White	A. Sharra (fore'n)	Evansville, Ind.
Evansville, Henderson & Nashville	Jos. Crawford	W. H. H. Price	Nashville, Tenn.
European & North Am. (of Maine)	A. O. Bailey	J. H. Brown	Oldtown, Maine.
Erie & Pittsburg	John Young	John Young	Erie, Pa.
Eldora			Dubuque, Iowa.
F			
Florida	A. W. Taylor	G. Hernandez	Fernandina, Fla
Flint & Pere Marquette	Sanford Keeler	Sanford Keeler	East-Saginaw, Mich.
Fitchburg	Geo. A. Cooledge	Enos Varney	Charlestown, Mass.
Fitchburg & Worcester	John Webster	Samuel Stevens	Fitchburg, Mass.
G			
Grand Trunk	*Richard Eaton	J. W. W. McWood	Montreal, Canada.
Galveston, Houston & Henderson	William McBeth	E. J. Sherman	Galveston, Texas.
Grand River Valley		James Potts	Jackson, Michigan.
Grand Rapids & Indiana			Fort Wayne, Ind.
Great Western of Canada	*Wm. A. Robinson		Hamilton, Canada.
Georgia	William Hardman	T. M. Preval	Augusta, Ga.
Greenville & Columbia	J. T. Price	J. T. Price	Helena, S. C.
H			
Hanover Branch	John J. Bingley	Henry Britcher	Hanover, Pa.
Hartford & New-Haven	N. Slingland	F. Leppense	Hartford, Ct.
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Houston Tap & Brazoria	A. Malsch	R. H. Yeomans	Houston, Texas.
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Hempfield	T. Marsh		Wheeling, Va.
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Hudson River	John Dykeman	Charles D. Mills	East-Albany, N. Y.
Houston & Great Northern		J. H. Bell	Houston, Texas.
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Indianapolis, Peru & Chicago	John McKenna	John McKenna	Peru, Ind.
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Indianapolis, Bloomington & Western	J. T. Otis	S. S. Smith	Urbana, Ill.
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Jackson, Lansing & Saginaw	Andrew Wilson	A. Wilson	Jackson, Michigan.
K			
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Knox & Lincoln			Bath, Maine.
Kentucky Central	J. R. Ledyard	J. L. Hackenthorn	Covington, Ky.
Knoxville & Charleston			Knoxville, Tenn.
Kansas Pacific	Geo. W. Cushing	Geo. W. Cushing	Wyandotte, Kansas.
Kalamazoo, Allagan & Grand Rapids			Kalamazoo, Mich.
Kansas City, St. Joseph & Council Bluff	H. L. Cooper	J. B. Barbour	St. Joseph, Mo.
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Lackawanna & Bloomsburg	Chas. Graham		Kingston, Pa.
Lehigh Valley	J. Kinsey.		South-Easton, Pa.
Lehigh Valley	P. Hofecker	E. R. Brown	Weatherly, Pa.
Lehigh Valley	A. Mitchell	Mauch Chunk, Pa.	Delano, Pa.
Lehigh Valley	D. Clark		Hazelton, Pa.
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Lehigh & Susquehanna	Wm. H. Brown		Mauch Chunk, Pa.
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Lewy's Island	C. W. Button	Damase Merceir	Milltown, Maine.
Little Rock & Fort Smith			Little Rock, Ark.
Lebanon Springs			Burlington, Vt.
London & Port Stanley			London, C. W.
Louisville, New-Albany & Chicago	Jacob Losey	Jacob Losey	New-Albany, Ind.
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Louisville & Nashville	Thatcher Perkins	Thatcher Perkins	Louisville, Ky.
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Michigan Southern Division	William Hill		Elkhart, Ind.
" " "		D. Sutherland	Adrian, Mich.
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Erie Division	L. O. Gassett	Jas. Withycombe	Cleveland Ohio.
Buffalo Division	B. H. Kidder.	J. N. Mileham	Buffalo, N. Y.
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Macon & Western	B. Pope Freeman	James A. Knight	Macon, Ga
Manchester & Lawrence	Edward Studley	M. W. Dickerman	Concord, N. H.
Macon & Brunswick	M. Thornton	M. Thornton	Macon, Ga.
Maysville & Lexington			Maysville, Ky.
Marietta & Cincinnati	E. Bosley	E. Bosley	Chillicothe, Ohio.
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Memphis & Charleston	Michael Burk	A. W. Drew	Memphis, Tenn.
Memphis & Charleston	L. M. Sellars	Fabien Varin	Huntsville, Ala.
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Nashville & Decatur	C. B. Knowles	C. B. Knowles	Nashville, Tenn.
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New-York & Oswego Midland	Wm. H. Griggs	Wm. H. Griggs	Oswego, N. Y.
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* Mechanical Superintendent. † General Master Mechanic.
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	Robert Curtis	Theo. Chamberlain	Columbus, Ohio.
	Thomas Denmead		Dennison, Ohio.
	Thomas V. Losee	John Gottschall	Indianapolis, Ind.
		James McGee	Steubenville, Ohio.
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Pittsburg, Fort Wayne & Chicago	J. M. Boon	Wm. Waddington	Fort Wayne, Ind.
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Portland & Kennebec	John Ellis	J. W. Trussel	Augusta, Me.
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Richmond & York River			Richmond, Va.
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Rock Island & Peoria			Rock Island, Ill.
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Toledo, Wabash & Western	T. G. Gorman	David Hoit	Toledo. Ohio.
Toledo, Peoria & Warsaw	A. H. De Clerq	R. M. Hemphill	Peoria, Ill.
Troy & Bennington			Troy, N. Y.
Troy & Boston	Foster Church	R. V. Coon	Troy, N. Y.
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Utica & Black River	John Bailey.	David James	Utica, N. Y.
Utica, Chenango & Susquehanna	C. H. Brown		Utica, N. Y.
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Vicksburg & Meridian	Jas. B. Brown		Vicksburg, Miss.
Vineland			Vineland, N. J.
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Vermont Valley			Rutland, Vt.
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Warwick Valley			Warwick, N. Y.
Wicomico & Pocomoke			Berlin, Md.
Wilmington, Charlotte & Rutherford	W. A. Gill	Thomas Myers	Laurenburg, N. C.
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Winchester & Potomac			Winchester, Va.
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Wilmington & Weldon	John F. Devine	John F. Devine	Wilmington, N. C.
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Western R. R. N. C	M. W. Atkinson	M. W. Atkinson	Fayetteville, N. C.
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Whitehall & Plattsburg			Plattsburg, N Y.
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Billmeyer & Smalls	York, Pa.
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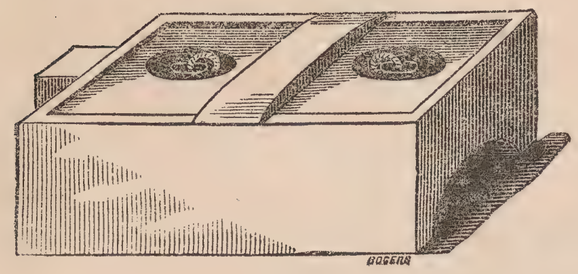

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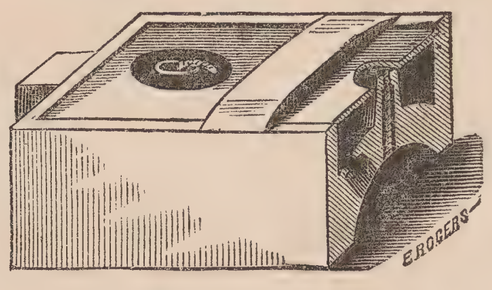

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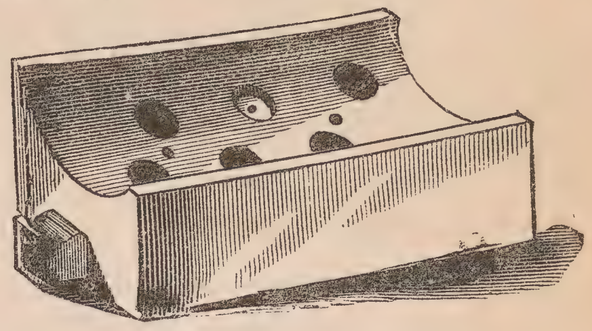

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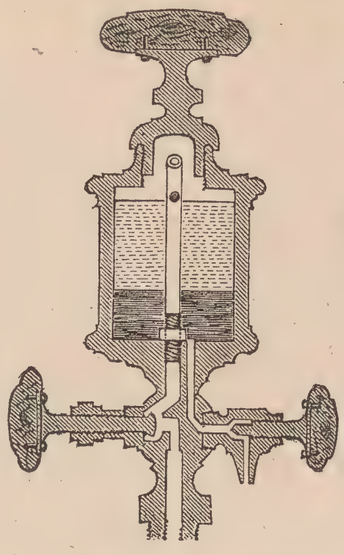

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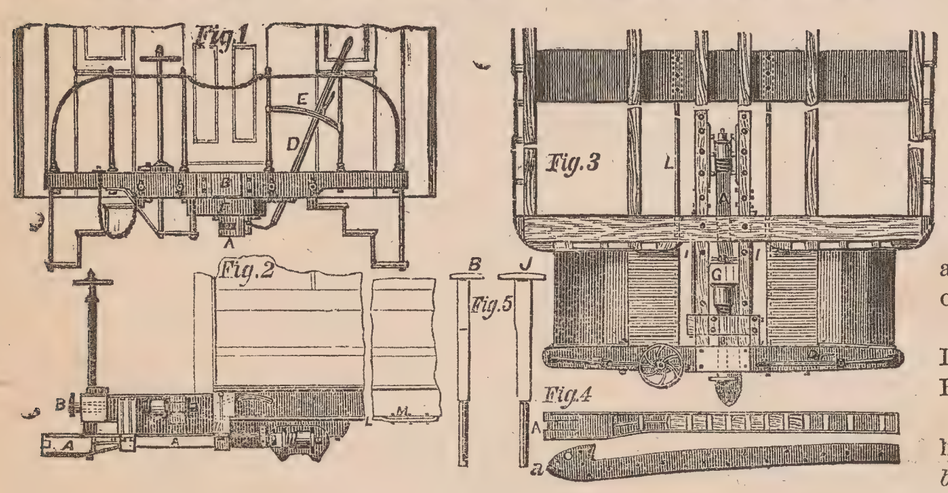

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DESCRIPTION.

Figure 1 is an elevation; Figure 2, a longitudinal section; Figure 3, a plan of an end of a car to which the arrangement has been applied; and Figures 4 and 5 show top and side views of the "Hook" and "Buffer," drawn on a larger scale than that of Figures 1, 2, and 3.

The letters refer to the same parts in all the figures. A is the coupling "Hook," B the "Buffer," C the "Stop," D the "Lever," E the "Quadrant Ratchet," F the "Truss Beam," G the "Spring Beam," H the "Suspender Beam," I the "Upward Trusses," K the "Main Spring," L the "Downward Trusses," and M the "Bolster."

The Platforms, instead of being located below the centre line of the main sills of the cars, are placed *in* that line, and held there by the Trusses I and L, so that the point of contact (in Buffers B) is *in* the said centre line and *not below* it.

The coupling "Hook" A is attached to the draw spring the same as the ordinary draw-head, and at the same height above the track, but in such a manner that the outer end is free to move laterally for a short distance. The Coupling Hook projects beyond the platform. The Stop C is placed under the Buffer Beam to prevent accidental uncoupling. When two cars are brought together, the Coupling Hooks, from *their shape*, push each other aside, until the Buffers B are compressed hard on the Buffer Springs, then—*the points of the hooks having passed each other sufficiently far*—the Hooks are carried forward by their main-springs, and thus the "*Coupling*" and "*Compression*" are both effected automatically *and at the same time*, and without the use of links and pins. When two cars are thus coupled together, the *head* of the *Hook* of each car is under the Buffer Beam of its opposite car, and the platforms are close together, (about 4 inches apart.) The effect of this is, *one platform can not be forced over the other*, nor can a *child* fall between the platforms; the dust and rain are nearly all shut out; the "Compression" makes the train run steadily, and prevents all jerking at starting and stopping.

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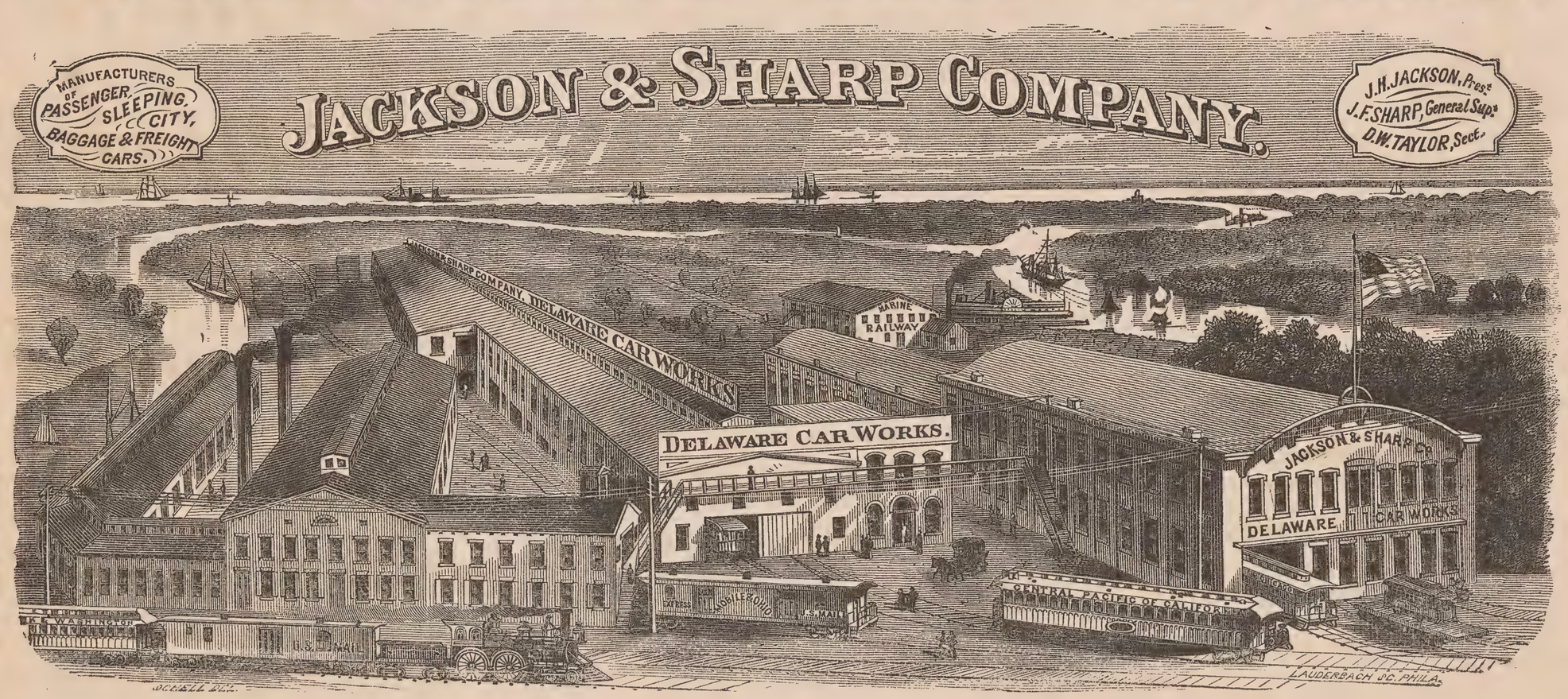
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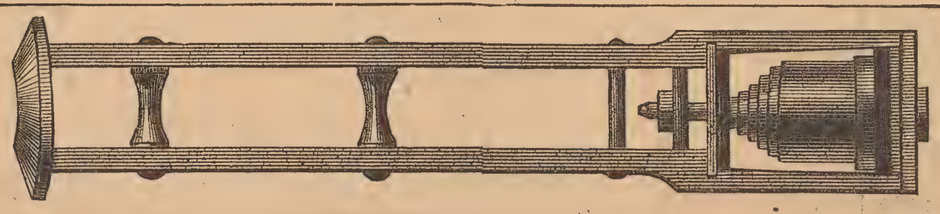

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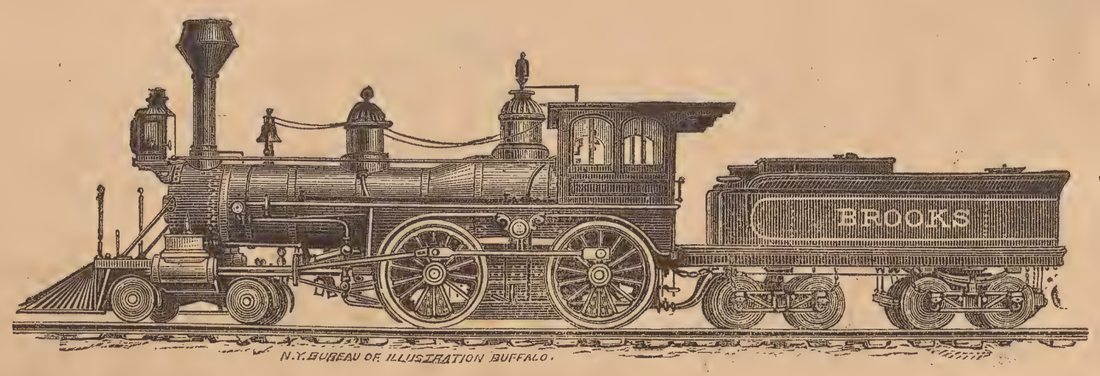

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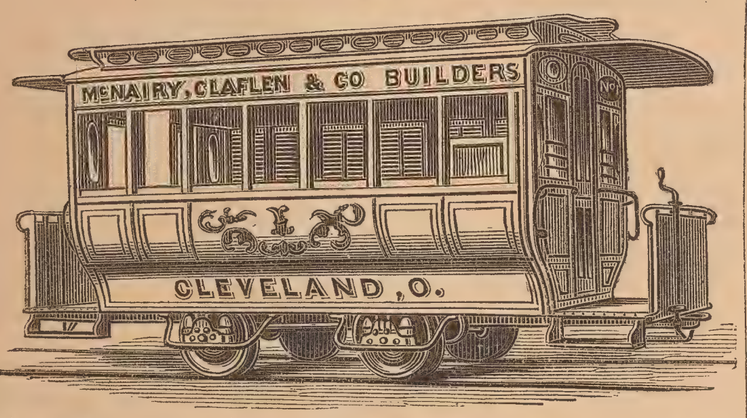

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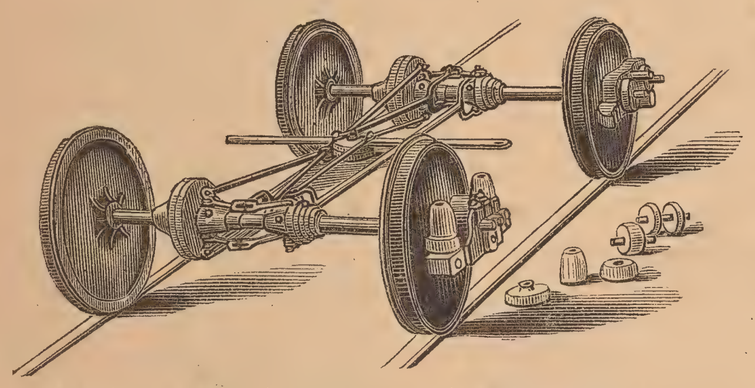

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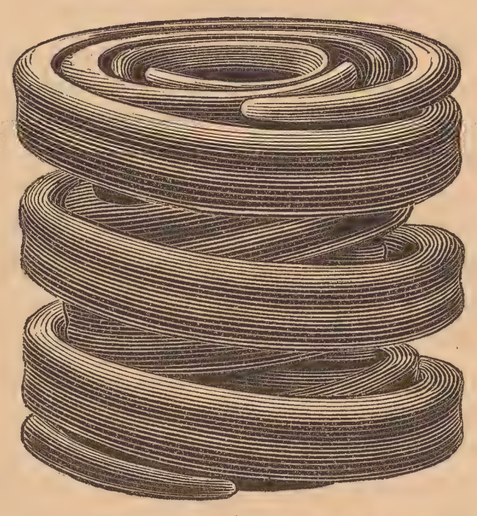

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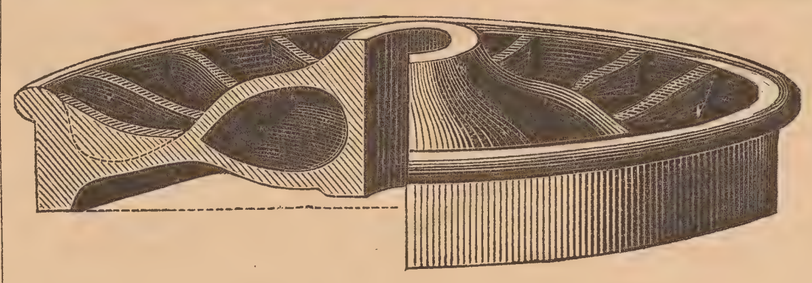

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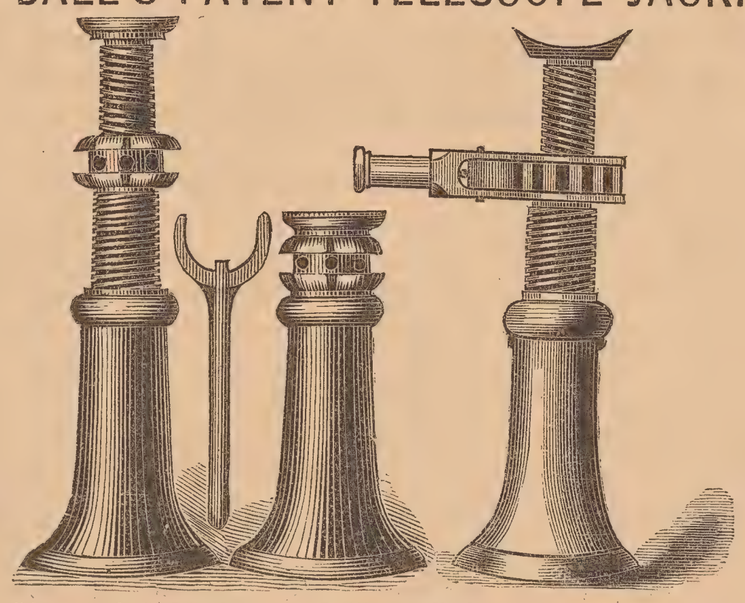

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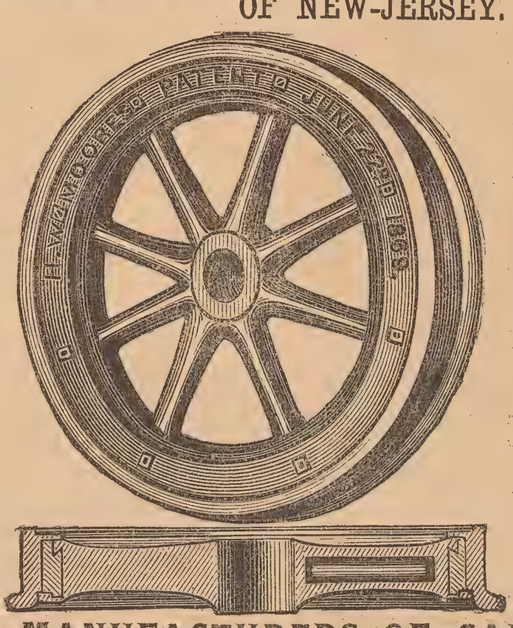

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DEVOTED TO THE INTERESTS OF RAILWAY ROLLING STOCK.

Vol. II. No. 5. | NOVEMBER, 1871. | *50 Cents per Annum. Single Copies, 10 Cents.*

Master Car-Painters' Association.

We copy from the official report of the proceedings of this association the following report, submitted by Mr. A. L. Scott, of the Boston, Lowell, and Nashua Railroad, Chairman of the Committee on Adulteration of Paint Stock:

OILS.

The purity of fixed oils may be determined approximately, and the admixture of cheaper oils detected; first, by observing the peculiar odor of the oil when gently heated by a spirit-lamp in a small porcelain or platinum capsule. The odor evolved will resemble that of the plant or animal from which it was obtained. In this way, linseed-oil, whale-oil, train-oil, or rape-oil may be detected, even when used to adulterate another oil. The test, however, is not always a safe one, for the odor of cold-drawn oil may differ from the same oil expressed under the influence of heat. Olive-oil has a different odor if grown at different places. Second, by mixing concentrated sulphuric acid with oil (1 or 2 parts acid to 100 oil) the temperature rises and the mixture becomes colored. If a plate of white glass be placed on a sheet of white paper, and 10 or 15 drops of oil be placed on the glass, and a small drop of acid added, a color will be produced which varies with the oil employed. With rape-oil, a greenish-blue ring forms at a certain distance from the acid, while toward the centre light yellow-brown streaks may be observed. In train-oil, from the whale or codfish, a peculiar motion begins at the centre and extends to the outside; a red color appears and becomes more vivid; in 10 or 15 minutes, the margin assumes a violet tinge, which in 2 hours is uniform throughout. Olive-oil instantly becomes pale yellow, and afterward yellowish-green. In linseed-oil, a beautiful, dark brownish-red web is formed, gradually changing into brownish-black. Tallow-oil becomes brown.

It seldom occurs that a better oil is used to adulterate an inferior one. Oil of almonds, olives, and codfish oil, will, therefore, never be used for adulterating rape-oil, but probably train or perhaps linseed-oil, and sometimes poppy-oil. If we are led, therefore, by the odor to infer an adulteration—for instance by train-oil, which occurs the most frequently—it is only necessary to place from 10 to 15 drops of rape-oil, the purity of which is undoubted, together with as much train-oil, and an equal quantity of the oil whose purity is suspected, and to add to each of them a small drop of sulphuric acid. From the color produced an inference may be drawn as to the purity of the oil, and by the differences of tinges, from the vivid red of the train-oil, and the bluish-green of the rape-oil, the extent of the adulteration may be detected.

The purity of oils may also be tested by referring to their densities, which are said not to vary in an appreciable manner, in the same oil, produced in different years. In Saxony, an acrometer or oleometer is used; it indicates the specific gravity of oils in such a way that pure rapeseed-oil is indicated by 37° to 38°; hemp-oil, by 30° to 31°, etc., etc. There are other tests. That by the capilearimeter indicates the quantity of oil which falls from a certain sized point under given circumstances. When oil of almonds or pure olive-oil is shaken in a vial, its surface remains even; but if mixed with oil of poppies, it becomes covered with small air-bubbles. When olive-oil is surrounded with pounded ice, it becomes completely solidified, which is not the case if adulterated with oil of poppies. Olive-oil is sometimes adulterated with honey, which may be detected by shaking the oil with hot water, which dissolves the honey, and the oil separates when left at rest. The presence of fish oil in vegetable oils may be detected by passing through them chlorine, which turns them black.

CARBONATE OF LEAD, OR WHITE-LEAD.

When pure, it is a soft, white powder of great density; it is insoluble in water, but readily dissolved by dilute nitric or acetic acid. The manufacture of white lead is for the most part conducted by the Dutch process. In this process metallic lead is cast into the forms of stars or circular gratings, 6 or 8 inches in diameter, and from $\frac{1}{4}$ to $\frac{1}{2}$ inch in thickness; 5 or 6 of these are put into an earthen pot, shaped something like a flower-pot, and containing a little strong acetic acid not in contact with the lead. The pots are arranged side by side on the floor of a brick chamber, and are embedded in a mixture of new and spent tan. The pots are then covered with loose planks, and a second range of pots is placed upon the former, and also embedded in tan, and in this way a stack is built up of 8 or 10 layers of pots, to the height of 25 feet. At Newcastle-upon-Tyne, where white-lead is extensively manufactured, a number of these stacks are arranged on each side of the inclosed space, each stack containing about 12,000 of the pots, and from 50 to 60 tons of lead. In France, pits of masonry are constructed for the purpose, and stable manure is the fermenting material. A pot is employed, having a ledge for supporting the lead, which is bent into a coil, and does not come in contact with the acid. The mouth of the pot is also covered over with strips or castings of lead, and then a plank, which serves as it were for the ceiling of one layer of pots, and the floor for another layer above it. Soon after the stack is completed, the tan begins to heat or ferment, and the temperature of the interior rises to 140°, 150°, or higher. This causes the acetic acid slowly to volatilize, and the vapor, passing readily through the gratings of the lead, acts as a sort of carrier between the carbonic acid evolved from the tan and the oxide of lead formed under the influence of the acid vapor and the oxygen of the air. The quantity of acetic acid used in proportion to the lead is so trifling, that it can only in an indirect manner lead to the production of the carbonate. In the first place, an oxide is formed on the surface of the lead, and with this a portion of the acid vapor unites to form a subacetate of lead. In the third place, the carbonic acid liberated by the fermenting tan decomposes the subacetate of lead, and converts it into a carbonate. Fourthly, the acetic acid thus set free determines the formation of another portion of subacetate, which becomes changed, in its turn, into carbonate. In this way the action proceeds, until, in the course of from 4 to 6 weeks, the fermentation of the tan is at an end. The stack is then unpacked, and the lead taken out; it retains the form in which it was cast, but has increased in size, and is converted into dense, white carbonate. In some cases, the conversion is complete; in others, there is a central core of metallic lead; these variations depending upon the position of the lead in the stack, as also upon the season of the year, the temperature, and the state of the atmosphere. The white castings of lead are passed through rollers, by which the carbonate is crushed and broken up, and the central core of blue lead thus separated from the white; the latter is next ground up into a thin paste, with water, and is then reduced, by successive washings and subsidences, to an impalpable powder. When dried by heat, it is without any signs of crystalline structure, even when viewed under the microscope. In this beautiful and remarkable process the texture and purity of the metallic lead are points of importance. Rolled or sheet lead will not answer. The gratings, coils, stars, etc., must be of cast-lead. The metal must also be pure; for if it contains iron, the white-lead will be of a tawny hue, and if a trace of silver be present, it becomes dingy under the action of light.

White-lead is largely adulterated with sulphate of baryta—a most villainous fraud, which may be easily detected by digesting a sample in dilute nitric acid, which dissolves the carbonate of lead but leaves the sulphate of baryta.

TURPENTINE.

On turpentine I have but a few words to say. Take a clean piece of glass, drop 10 or 15 drops of spirits on the glass, expose it to light and air, and if it evaporates clear, without leaving a greasy residue on the glass, it is fit for the painter's use.

LINSEED-OIL.

Mr. Samuel Lunt, of the Fitchburg Railroad, from same committee, offered the following report, which was received, placed on file, and ordered printed:

After 10 months of careful study and many trials, I find that linseed-oil varies in weight from $6\frac{1}{2}$ to $7\frac{3}{4}$ pounds by the single gallon; and I find that the oil that weighs $7\frac{1}{2}$ pounds will do more and better work than oil weighing more or less; and I further find that it makes a difference whether the oil is bleached with acids or by time and heat. I think the best method of testing, and the most reliable, is to weigh a single gallon, and test the same.

I think that this is one of the most important articles in painting, and hope if there is a better method, some one will make it known.

WHITE-LEAD.

I have used Forest River lead for 10 years; about 6 tons per year; and as I have had many questions asked about it, I will say that with me it has the faults as with others, that is, in color and fineness. I can not give the reason for its being so, but I will say that pig-lead has silver in it, and that, perhaps, will make the dark shade, and that there is antimony, which will give it the pink shade; and as they have only stone-mills in the factory, it can not be by grinding in iron-mills, as some think. But there is a cause for it that I can not give until I have further tested it. With all their leads, if they had more time, after being ground before using, they would be better.

ENGLISH VERMILION.

We all have more or less trouble with it. The best method of testing is by burning it. If it is pure, it will all burn like sulphur; if not pure, it will burn black, and leave a sediment.

Wooden Railway.

THE Montreal *Herald* gives an account of a trip of inspection over the new line of wooden railway from Sorel to Arthabaska. This road is the longest wooden railway in the world, or will be when fully completed. The track is the full width of our ordinary roads, so that any ordinary car or locomotive can run over it. The ties are of hemlock and tamarack, cut to the proper length, and mortised to receive the rail by an ingenious arrangement of circular saws, on a long shaft, so as to cut three or four at once. This machine is portable, and is drawn along the line as fast as it is finished. The rails are of rock maple, four inches wide by seven high, and fourteen feet long. The train ran over this wooden road at the rate of twenty-five miles an hour, and ran as smoothly as on the best iron rails, and with scarcely any noise. But the great fact is, that this road only cost $5000 a mile, including right of way, clearing, grading, constructing, engines, cars, depots, bridges, engine and repairing-shops, warehouses, and every thing complete, except one large bridge over a wide river. It has nine stations with station-houses, a car and locomotive depot, engine and repairing-shops, one engine and tender, two passenger cars, eight grain-cars, twenty-five platform-cars, and several miles of fences, all furnished complete for $5000 a mile, and payment made in bonds at that, and not in cash! The directors expect that the road will earn the money necessary to iron it, in case they ever think best to change it to an iron road, within a short time.

Locomotive Engineers.

THE eighth annual convention of the Brotherhood of Locomotive Engineers was held at Toronto, on the 18th ult. Delegates were present from nearly all the divisions of the brotherhood, of which there are now 136. Five of these are in the Dominion of Canada, and the remainder scattered over the States. On the first of October, $15,000 was standing to the credit of the widows' and orphans' fund, ready to be applied to the first case of necessity; and a grand total of $25,570 attested the prudent management and the wide interest taken in the objects of the society.

Attached to the brotherhood is the Locomotive Engineers' Mutual Life Insurance Association, organized expressly for the benefit of the families of deceased and disabled members, and requiring the payment of one dollar by every member on the death of a fellow-member. On the first of July last, the life association had been in existence three years and a half, during which time 86 deaths had occurred, and 88 assessments had been made. Fifty of these deaths resulted from disease, and the residue from casualties of various kinds. The assessments had brought into the common fund an aggregate of $196,358, which had been distributed among the sufferers.

Revised Constitution and By-Laws of the Master Car-Painters' Association of the United States.

ARTICLE 1. This association shall be known as the Master Car-Painters' Association of the United States.

ART. 2. Its members shall consist of master car-painters of the respective railroads in the United States. On railroads having two or more divisions under charge of one master painter, the foreman of each division shop will be entitled to membership, by presenting credentials from the master painter.

ART. 3. The object of this association is for the mutual improvement of its members by discussing the practical management of the paint-shop, and the methods now used in mixing and applying paints and varnishes on all classes of railroad work, and to enable us to more readily detect the adulterations that paint-stock is sometimes subjected to, knowing that, by a general discussion of the subjects, we may all profit by the experience of others more proficient in our craft, and be of increased service to those for whose interest we labor.

ART. 4. The officers of this association shall consist of a president, vice-president, secretary, and treasurer, whose term of office shall be for one year.

ART. 5. The election for officers of this association shall be by ballot at each annual meeting of the association. The person receiving a majority of the votes cast shall be declared elected. No person will be entitled to vote until he has registered his name, and the name of the road he represents.

ART. 6. It shall be the duty of the president to preside at the meetings of the association, to appoint all committees, to decide all points of order, and exercise a general supervision over the affairs of the association.

ART. 7. The vice-president shall assist the president in such duties as the president may desire, and, in the absence of the president, he shall preside at the meetings of the association.

ART. 8. The secretary shall act also as treasurer. It will be his duty to keep a correct record of the proceedings of the association, to attend to all correspondence, to keep a record of the members, to receive all moneys, and pay all bills of the association by order of the president.

ART. 9. The fee for membership in this association shall be two dollars, ($2.)

ART. 10. Each member shall pay annually to the association his proportion of the moneys necessary to meet the expenses incurred by vote of the association.

ART. 11. The annual meeting of this association will be on the first Wednesday in September.

ART. 12. This constitution and by-laws may be amended at any annual meeting by a two thirds vote of the members present.

RULES OF ORDER.

1. Calling meeting to order.
2. Calling roll.
3. Reading minutes of previous meeting.
4. Reports of officers.
5. Election of officers.
6. Reports of committees.
7. Unfinished business.
8. New business.

Goodall's Steam Brake.

AN experimental trip was made with the brake on the Pacific Railroad of Missouri, between St. Louis and Allenton, which is reported as follows in the St. Louis *Republican*:

"The apparatus consists of an iron tube running beneath the cars and connected at the couplings by adjustable tubes, so that the pipe is continuous throughout the entire train. In the middle of each car is a small cylinder, with two pistons, one at each end of it, from each of which connecting-rods extend to the brakes. When steam is injected into the tube from the engine, it fills it throughout the entire length instantaneously, and the steam, entering the cylinders between the two pistons, forces them apart and presses the brakes with great force against the wheels. The pressure continues until the supply of steam is shut off and the pipe is opened, when the steam escapes and the pistons are drawn back by spiral springs attached to the connecting-rods. A self-acting valve in the cylinder at the same time opens and permits the water condensed from the steam to escape. The steam is supplied from the boiler by means of a pipe inserted in the top. To this there are two valves, one for opening and the other for drawing off the steam, which are operated by a lever. The engineer presses the lever slightly forward, and a valve opens, injecting steam into the tube and cylinders, and stopping the train; he pulls the handle of the lever toward him, and the valve closes, shutting off the steam, while the other valve opens and empties the cylinders and tube, relieving the pressure of the brakes from the wheels. The brake can be worked by either steam or compressed air, but the former is preferred, being instantaneous in its operation, and, consequently, more speedy and effectual than air in stopping a train. Like most valuable inventions, the steam brake is simple in construction and easily worked. Mr. S. M. Goodall, the inventor, with Messrs. A. W. Mitchell and James O. Carson, who also are interested in the patent, explained the manner in which the brake was worked.

"The first experiment was tried at Meramec, where the train stopped while going at the rate of forty-five miles an hour, in thirty-three seconds, and in a distance of 1050 feet. The train was backed up to Allenton and the hand-brakes were tested. The brakemen were all in their places, and when the whistle sounded brakes down, they at once applied the hand-brakes, while the train was going at a speed of thirty-eight miles an hour, and stopped it in thirty-seven seconds, in 1290 feet. The severest test was applied at Oaklands, where the train, while running at the rate of forty miles an hour, on a down grade of forty feet to the mile, was stopped in thirty-six seconds, and in a distance of 1733 feet. The gentlemen superintending these experiments were Col. J. B. Moulton, City Engineer, and Mr. Louis Nickerson, Civil Engineer, of St. Louis."

A Palace-Car Episode.

A CORRESPONDENT of the Chicago *Times*, regardless of the axiom that one should be blind to what he should not see, makes the following surprising revelations of what occurred in a palace-car state-room adjoining the one occupied by himself:

"On that Wednesday morning I had interrogated the plains at first dawn, but, repelled by their sad monotony, I fell back in my berth with disappointment. Sunrise came, and I still lay there dreaming and waiting, when my attention was attracted toward a state-room which was just beyond me on the opposite side. The door was slightly opened; and accident or the wind had so displaced a curtain that I could not but see the whole of the interior.

"I blush as I write it; but what I saw I could not help seeing, and my sensations were so curious that I can not resist attempting a description of beauty and its toilet.

"It was she—the slender, *spirituelle* bride. The fond husband was lathering himself before the mirror in the wash-room, and she availed herself of his absence to resume the proper garniture of day.

"She sat so that I had a three quarter view of her back. She sat on her berth, with her eyes fixed on the mirror in the wall. Her alabaster shoulders were bare; and a naked foot with rosy toes peeped out from the mass of white upon which she was seated. Her arms were bare to the shoulders, save a narrow bridge of white; and those white and slender arms went wilderingly around in all kinds of mazy twinings and intertwinings as their fair owner arranged her beauteous locks.

"Many of those curly nests of attraction which I noticed upon her head the day before were taken from a box, where all night they had had the supreme plea-

sure of resting by the feet of their charming mistress. How those locks grew from thin nothingness into a mazy coiffure that was as artistic as it was entrancing!

"And now the happy corset enclasped the slender waist, and long fingers came around behind and deftly wove up the raveled woof, whose completion was a close and envied embrace. Then a critical glance into the mirror, as the head turned from side to side, and the slender fingers moved here a curl and there a friz, whose change made the *tout ensemble* the more coquettish and charming.

"And then the long, shapely hands went down into the box and fished forth a twin combination of an unknown character. They were grayish in color, and looked like an immense pair of goggles, save that their converse surfaces were accurately rounded like the exterior of a hemisphere. The twin combinations she placed carefully within her corsets, at the upper edge, in front, and then she glanced into the mirror and regarded the blissful twin concavo-convexities with approval.

"Just here I blushed at discovering what I was doing, and I at once withdrew my eyes. What! gaze thus upon an innocent, beautiful creature as she puts on the armor of her charms! Never will I be guilty of a clandestine operation of such a nature. And I persistently looked out of the window upon the sad wastes of the plains."

The Westinghouse Brake.

Mr. George Westinghouse, the inventor of this valuable device, is a man young in years, a native of New-York. When a boy, he conceived the theory of the brake, and more nearly perfected it as he grew to manhood. Not unlike most great inventors, he lacked the money to experiment upon and practically introduce his invention. Conservative, old-fogy gentlemen controlling railways replied with an ominous shake of the head when asked to give the brake a trial. I remember the reply of a railway manager, fifteen years ago, to a request that he substitute a self-acting car-coupler for the man-crushing ones in use. It was, "Your device would be more expensive than Paddies are." But coming to Pittsburg, Mr. Westinghouse found live, sagacious young men of capital, who, forecasting the innumerable benefits, both to the traveling public and railway companies, which this improvement was destined to secure, stepped unhesitatingly forward and enabled the inventor to realize the glorious dream of years. The wide-awake railroad officers of the network of trunk lines centring here, always ready to improve the modes of transportation over their railways, gave every encouragement for a fair trial of this new and curious device. That was two years ago. In the spring of 1869, a patent was issued, and, a satisfactory pump having been obtained after encountering many difficulties, a complete brake was placed on a train of the Pan Handle Road. The eagerness of the young and enthusiastic inventor may be imagined. The hope of years hung in a balance. Would the first test prove a failure? The train dashed out of Pittsburg into the bridge over Monongahela River; the suspense could be no longer endured. There, above the pure swirling mountain waters, the first test was made. It was a surprising, joyous success! And with the vehemence of a shout, in voices matching Forrest's, there arose upon the air the familiar quotation, "In the bright lexicon of youth there's no such *word as fail!*"

Very soon thereafter, a manufacturing company was organized, with Mr. George Westinghouse, Mr. Ralph Bagaley, and Mr. Robert Pitcairn as officers. Brakes were made and new trials had. These were attended by uninterrupted triumphs. The Pennsylvania Central Railway was the first to adopt it as a substitute for all other brakes, and equip with the Westinghouse its entire passenger service.

The Denver and Rio Grande Railway is completed to Colorado Springs, a distance of 76 miles from Denver.

Railway Statistics.

From Poor's recently published *Railroad Manual* we deduce some interesting statistics.

It will be found that, commencing from the year 1841, at which time there were 3535 miles of railroad. until 1848, the yearly increase was about 300 miles, From 1848 to 1855, there was a yearly increase of 1700 miles; and from that date a gradual diminution till the minimum yearly mileage was reached in 1861. From that date there was a gradual increase until the close of the war in 1865, when so great an activity was shown that, while in 1865 the increase was 3000 miles per annum, we find it last year to be 6000 miles.

There are something like 1300 to 1400 railroads projected, in progress, and completed, and the number is rapidly increasing.

As illustrating the variety of gauges and the number of each kind, we have deduced the following table, which shows the differences of practice in this country:

Gauge.	Number of Railroads.
3 feet	2
3 " 6 inches	2
4 " 3 "	1
4 " 3½ "	1
4 " 5½ "	1
4 " 6 "	6
4 " 8 "	3
4 " 8½ "	307
4 " 8¾ "	2
4 " 9 "	13
4 " 9¼ "	3
4 " 9⅜ "	1
4 " 9½ "	7
4 " 9¾ "	1
4 " 10 "	30
5 " ..	74
5 " 2½ "	1
5 " 9 "	1
6 " ..	31

We find by examination that there are upward of 10,000 locomotives, and about 214,000 cars of all kinds, which makes a ratio of 1 locomotive to 20 cars. It must be recollected, however, that coal companies using a great number of cars (and those mostly four-wheeled) with comparatively few locomotives, increase this ratio, while only a few smaller roads, constructed through mountainous country, require greater locomotive power in proportion to the amount carried. Allowing 30 feet only as the length of a car, we would have, if all the cars were connected in one line, a train extending from New-York to the Mississippi River; while, allowing 50 feet as the length of engine and tender, there would be a line of locomotives 100 miles long. The total mileage of railroads was 53,399 at the beginning of 1871. Illinois comes first in the total length of its roads; Pennsylvania follows closely, then come in order New-York, Ohio, Indiana, and scattering along all the other States and Territories, concluding with Rhode Island, with 136 miles.—*Railroad Gazette.*

Petroleum for Locomotives.

A French inventor proposes the use of petroleum for locomotives, and recently exhibited a model of a small engine heated by this means, for which complete success is claimed. This locomotive carries two thousand litres, or about five hundred gallons of oil in the tender, a hand-pump forcing the oil into a small reservoir near the boiler. The process of lighting the oil is said to be neither difficult nor dangerous, owing to the oil being kept in compartments, a small quantity only being lighted at one time, then another division, and so on, until the whole furnace is alight. This engine consumes its own smoke perfectly, and it is said to be extremely easy to drive, on account of the simplicity of the apparatus. A larger locomotive, with slight improvements, has since been built, and successful trials made of its working qualities. The consumption of oil was thirty-five per cent less by weight than that of good patent compressed coal, a little more than two pounds of oil producing twenty-five pounds.

Water Bearings.

The use of water as a lubricant is by no means new. Indeed, it may be said to be as old as the use of a mill-step, and in various ways it has been suggested for purposes now almost forgotten.

Among these is the lubrication of car-journals, a stream of water being made to flow continually to the bearing, and serving not only to provide a smooth film between the adjacent surfaces, but to conduct away the heat unavoidably generated by friction. Trials made with "water bearings" on this plan were claimed to afford satisfactory results on English railways nearly a dozen years ago; but doubtless difficulties of a practical character gave the lie to the plausibilities of theory, for the matter seems to have awakened no attention for a long time.

In another form, however, water has been applied to constitute an anti-friction support to journals, and the question of its utility is one of little intricacy. In this, a stream under pressure is forced beneath the journal, and so confined as to lift the same from the solid metal of the box. The journal, of course, runs wholly in water, and, consequently, without friction. But as the pressure must be maintained by some sort of machinery, this latter must necessarily be subjected to friction in its operation, and this in a ratio proportionate to the pressure and supply of water, in its turn proportionate to the pressure exerted by the shaft and the rapidity of its rotation. Whether the mere transfer of the friction from one part to another effects a saving of power, and a relative saving in wear and tear, is the query. Other things being equal, it is evident that it would not; but, on the other hand, the pump piston works in water and is lubricated thereby, and will, therefore, heat less, and presumably wear less, than if the frictional surfaces were lubricated with oil.

A successful application of this use of water under pressure as a support for bearings has been made with heavy vertical shafts, the more recent devices being made with a valve arrangement, so that, when the water forming the bearing exceeds a given pressure, the lifting of the shaft permits the surplus to flow out through a waste-pipe. This, by the use of a slight surplus of power over and above the actual necessities of the case, insures a constant and uniform thickness of water under the step or bearing extremity of the shaft. We are assured that this plan is found to work extremely well, and that it is applicable to many cases where lubrication in the usual way gives only trouble and expense.—*American Artisan.*

Comfort for Travelers.

The Boston *Transcript* says, for the benefit of railroad travelers, that the desideratum so long sought for by inventors, namely, a practical spark and dust-arrester, after repeated experiments and failures, has at last been brought to what may be termed perfection by a gentleman of Massachusetts. The invention is simply a curved smoke-stack, in nearly the shape of a "horn of plenty," attached as ordinary smoke-stacks are, the mouth running backward toward the centre of the locomotive. Within, near the enlargement at the upper curve, is placed a wire screen, at an angle of about forty-five degrees with the direction of the smoke, and the usual screen is placed over the immediate outlet.

Just below the first screen, a perforated steam-pipe is run horizontally through the smoke-stack, connected with the boiler by a valve-pipe, under the control of the engine-driver. As the refuse matter from the furnace passes through the stack, it is moistened by the fine spray ejected from the perforations, thus deadening the particles and increasing their weight. Striking at the inclined angle named above against the first screen, they are prevented from passing through, and fall to the under curve of the stack, whence, through the natural motion of the engine, they are directed by a tube to beneath the boiler, and thrown upon the track in a moist and consequently harmless state.

The Night-Train.

NIGHT passengers will appreciate the following sketch of the interior of a sleeping-car at day-break: The car lamps have gone out disgusted, the little wakefulness of the sleepers has subsided, and the dim, snoring outline of cloaks and shawls, and frightened-looking heads, flecked here and there, like a troubled sea, with white, compose the landscape; while over all, like pendulums, swing plethoric carpet-bags slowly to and fro, and little satchels, brisk as mantel-clocks, and bonnets, made of nothing, dance up and down like blossoms in a rain, all timed to the motion of the train.

But the dim gray turns to an old-eyed white, and the breathing bundles begin to stir; out of an egg-shaped package is hatched a woman, with locks disheveled, like Venus from the sea. A throe or two, and a rougher form emerges from cloak and shawl and shakes itself awake. A shapeless heap turns out a man, bearded like a pard. A pair of boots, thrust out like bowsprits, goes out of sight as the owner comes in view. One is soothing an irritated hat with gentle touches of his elbow; another pulling at his wilted collar. Disordered tresses are smoothed with hasty touches of the hand, and crumpled sleeves persuaded into shape. One lady has learned her lesson from Grimalkin, and makes her toilet precisely like a cat.

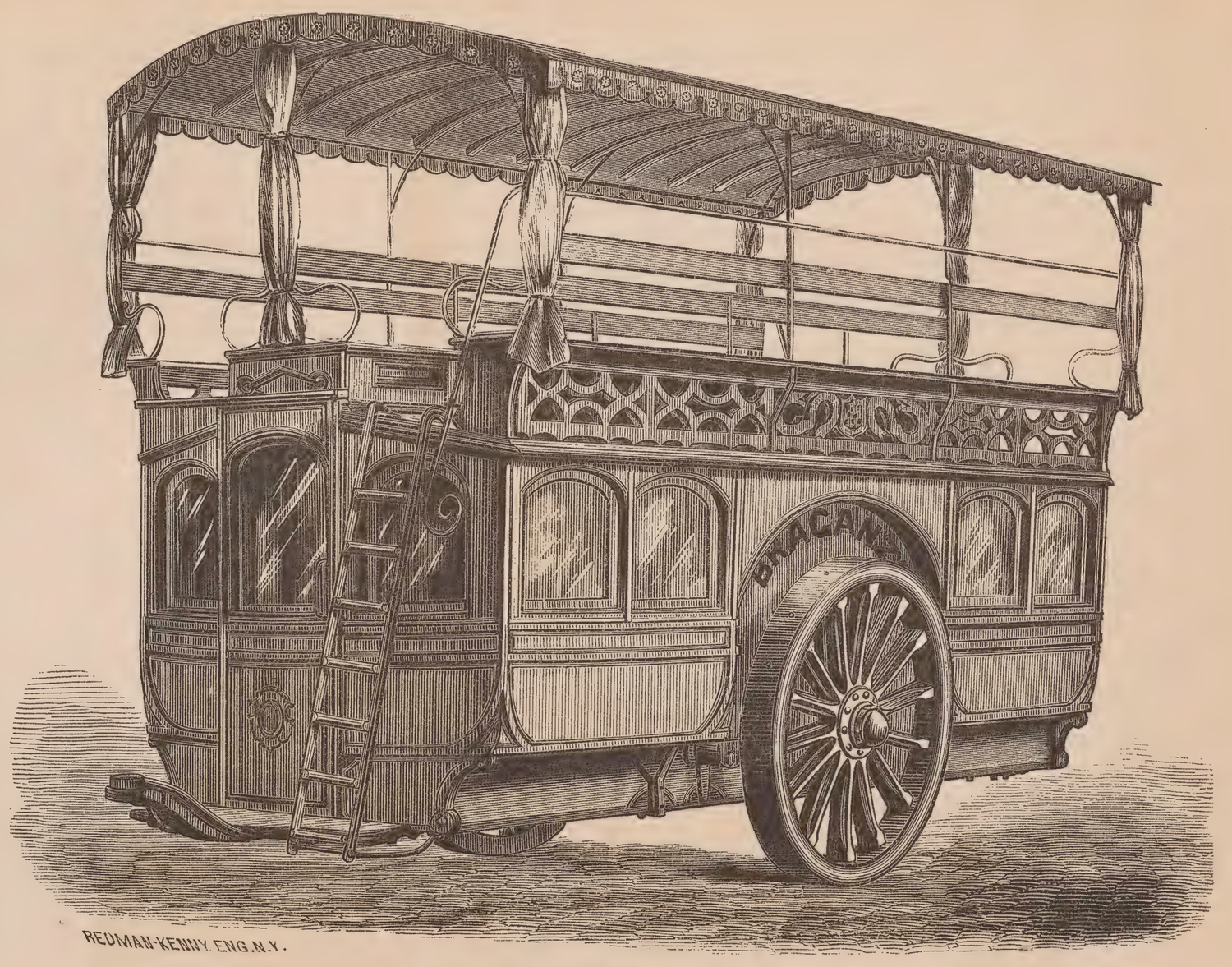
The cold, clear light of early morning is always trying to human beauty; there are no tints to be borrowed, no softening shades to be worn; a plain, cold stare that looks one out of countenance. But in a railroad train the ordeal is appalling. If a face ever looks faded, it is then; if the hair has any gray in it, it is sure "to show;" wrinkles are read, like a sign-board, afar off. If there be discontent in the heart, it comes into the mouth, and every body looks like people after a masquerade, or Richard after he became "himself again."

Thornton's Sectional Platforms.

THIS invention, which has proved such an effectual dust-preventive, has recently been placed on the Chicago and Alton passenger trains. It completely covers the track beneath the cars, extending a few inches outside the wheels, firmly secured to the trucks, and suspended about five inches above the rails; and as a train of passenger-cars supplied with these "platforms" is made up, there is a continuous floor or platform covering the track, the entire length of the train; preventing the forced air from striking the ground, which is the immediate cause of putting the dust in motion.

The first train using them was composed of a locomotive, express-car, and six passenger-coaches. The platforms were only under the coaches, and yet the train, it is said, was as free from dust as if the road-bed had been wet by a recent shower. The passengers were in ecstasies that the result was so unexpectedly satisfactory; and, contrary to former theries, the last car in the train was fully as free from dust as any one of the others.

Mr. Philbrick, the conductor of the train from Bloomington to East St. Louis, said he had never had the cars so free from dust except when it was laid by rain. The conductor of the dining-car—which is the last car of the train—states that, during a run of two years, yesterday was the first day he had been able to have the doors and windows of his car open. The engine, tender, and baggage-car, not being supplied with the platforms, a fact was demonstrated by this test of great importance to railroad men. The accumulation of dust and gravel thrown upon the platform beneath the first car, thrown up by the wheels of the engine, tender and baggage car, increased to such an extent that it was shoveled off several times during the run from Chicago to St. Louis, while there would have been none at all to come in contact with the axles, boxes, and other machinery, had the platform extended under the whole train.



Boyall's Steam Road-Omnibus.

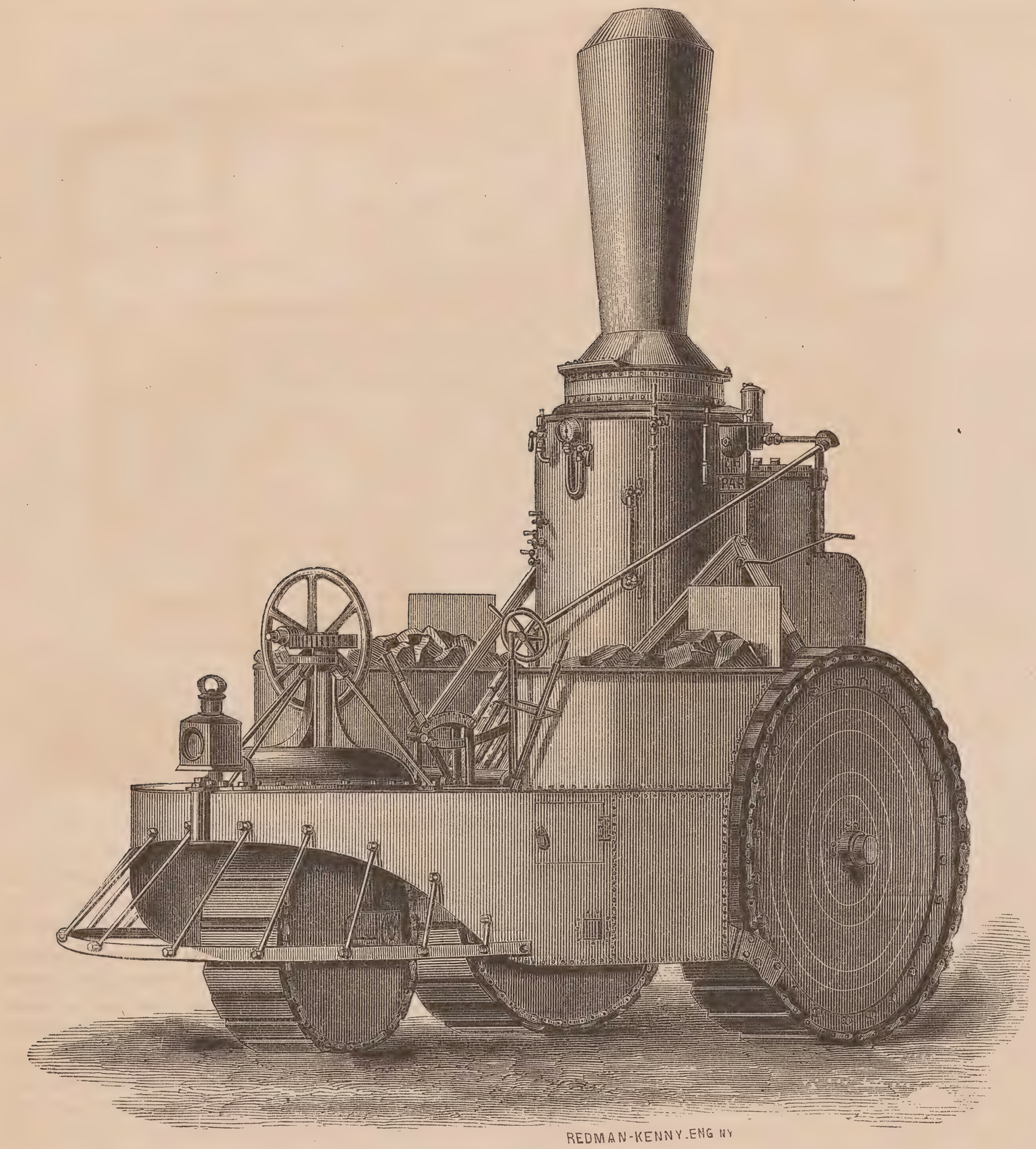
MR. BOYALL, the enterprising coach-builder of Grantham, England, has just completed two monster omnibuses to be sent to Brazil, and intended to run on common roads by means of traction-engine. These vehicles, as will be seen by the excellent engraving we give of one of them, are of novel design. Their extreme outside dimensions are seven feet wide by sixteen feet six inches in length, with a capacity for carrying sixty-five passengers each—thirty inside, and thirty-five outside. The inside is furnished with comfortably arranged cane-work seats, and on the roof, or outside, are four rows of seats, one on each side, facing inward, and two running down the centre, as in the London street omnibus, where the passengers sit back to back. This enormous load is carried on two wheels only, which, as may be supposed, are of massive construction. They are fixed at the centre of the vehicle, and alone weigh eleven hundred-weight. The axles are equally ponderous, being four inches square at the bottom, and tapering to three inches square at the top; but instead of being attached on the transverse horizontal plan, as on all road carriages, they are fixed in a vertical manner, and run up through the body, having a strong solid flap to bolt to the springs above and below, the former being fixed on the top rail, and the latter under the bottom side, all thoroughly secured by irons and bolts of well tested and undoubted quality.

While these carriages were in progress they were much talked about beyond the factory walls, or the town of Grantham, and a good deal of curiosity was excited among those who were unacquainted with the manner in which they were to be constructed, to know how such heavy vehicles, with but two wheels, could keep their balance, supposing the weight to be unequally distributed. This is effected by a strong draw-spring in connection with a draw-bar, jointed to allow a small play of the spring, just as much as the body springs already described will require; and when the apparatus is attached to the engine, it will be seen that the engine acts as a fore-carriage to the omnibus, and that it can not tip nor deflect more than the respective springs will permit. This is an application of the equi-rotal system on an extensive scale, which seems more likely to be carried out to great purposes of utility in the direction to which Mr. Boyall applies it than in any other. This system was introduced many years ago by Mr. Adams, who applied it to private pleasure carriages, but it met with little favor. More recently it has appeared in the form of the "parallel-rolo," a light description of Stanhope phaeton; but in such vehicle the advantages it offers are far more imaginary than real, whereas in a road conveyance of such proportions as this Brazil omnibus, the advantages are at once apparent. Each wheel acts as the centre upon which the vehicle turns, and in going round a corner far less compass is required than would be if it were constructed on the common principle; and on two wheels there is only half the purchase there would be on four.

The passengers on the outside, or roof, are sheltered by a light airy canopy and side curtains, which are tastefully arranged, and agreeably affect the eye; and along the outside edge of the roof is some artistically arranged screen-work protecting the outside seats. A shield, with a scroll on each side, is left in the centre, and on the shield on one side is painted the borough arms, on the other the Lincoln arms, and on the scroll or ribbon, "Boyall, builder, Grantham, England." The omnibuses are painted green and yellow, the national colors of Brazil, which are relieved with yellow and gold. There is a door at the end of each carriage, so that passengers may pass through from one end to the other. Upon the door panels are emblazoned the Brazilian arms, surmounted by the imperial crown, and the heraldry reflects great credit upon the artists.

The work throughout is substantial and durable, and yet the omnibuses, as they appear outside of the factory where they have been constructed, are light, elegant, and well proportioned. Mr. Boyall is building another for the Morea of Greece, and there is no reason why they should not come into general use. They would prove excellent adjuncts for railways, either for supplementary passenger traffic between places where a permanent railway would not pay, or in transporting heavy merchandise from the main stations to towns and villages, as occasion might require.

On the completion of these vehicles, Mr. Boyall was desirous of ascertaining their weight, and for this purpose one of them was attached to a patent engine, constructed by Messrs. Robey & Co., of Lincoln, and made its first public appearance in the streets of Grantham. It was drawn to the Spittlegate Iron-Works of Messrs.



Boyall's Traction-Engine.

Thornsby & Son, and, being placed on the machine its weight proved to be three and a half tons. The carriage was then filled with passengers, and the engine conveyed them back to the Brownlow Carriage-Works, where the other carriage was coupled to the train, and also filled with passengers. In order to test the efficiency of the workmanship, the train, then containing about one hundred and eighty passengers, moved steadily through the centre of the town, causing no small degree of excitement at so unusual a mode of traveling. After passing through the principal thoroughfares, a trial trip was decided upon to test the capabilities of the engine with this tremendous load, the engine having been built expressly to accompany the carriages to Brazil. (See the above engraving. After a two hours' trip, the result was pronounced most satisfactory, although the rate of speed was not so great as could have been attained, owing to existing laws which prohibited a greater speed than four miles an hour for such conveyances.

The Pneumatic Motor in Chicago.

FOR several weeks, now, says the Chicago *Post*, a single street car has been running at irregular intervals on the north side, propelled by compressed air, and a similar one, drawn by a dummy engine, driven by compressed air, has been making experimental trips on the Hyde Park track. Thousands of our most enlightened and thoughtful citizens have examined its operation, and they believe the day not far distant when the new motor will, in the joint interest of economy and humanity, be substituted for the poor horses who drudge and die upon the city tracks.

The principle of the pneumatic motor has been long known, and it was fully explained to the world at least thirty years ago in Babbage's *Economy of Machinery*. His idea was to compress the air at the great centres of power, at coal-mines, and then to move the air and deliver it as so much power ready for use. The present experiment is the compression of air at one or two points in the city by stationary steam-engines, its transfer to reservoirs in connection with the movable engines, and the delivery of the compressed air upon a piston, which, in turn, moves the driving-wheels. The "engine" now in use in Hyde Park is of about the size of the ordinary dummy, which it resembles. It is capable of carrying eight hundred feet of compressed air, and a light engine underneath, geared in a simple way to the cog-wheel of the forward axle. The air presses, at starting, at the rate of one hundred and twenty pounds to the square inch, and is delivered upon the piston in the same manner as steam; but whereas steam holds its own, maintaining its full power while it lasts, the compressed air grows weaker and weaker as it is used, until replenished at the stationary reservoir. Another notable circumstance is the fact that, while steam at once becomes condensed and impotent water on cooling, compressed air loses none of its power when not in use, whether confined in either the stationary reservoir or the engine. The dummy was left on the track at Hyde Park on Saturday evening, with compressed air gauging twenty-six pounds to the square inch, and on Monday morning the index showed that all the power had been retained, and the engine moved off on touching the lever.

The Hyde Park dummy is capable of drawing four or five, or even more, street-cars, loaded with passengers, and it is proposed to substitute it for horses, and draw up several cars when they go home crowded in the evening. This will doubtless be a great relief, and with a delivering reservoir at the centre of the city, and another at the suburban terminus, the project is entirely practicable. A fair estimate shows that pneumatic power would cost less than one fourth as much as the same amount of horse-power, returning a grand premium to any company making the change

Lake Shore and Michigan Southern Railway.

THE Detroit *Tribune* says that the business demands upon this line have become enormous, as indeed is the case with all the great trunk roads east and west. On the Toledo division over sixty trains are run daily, and the necessity for increased track facilities and other improvements has become imperative. The rolling stock of the line is already large, but new and more powerful locomotives must be obtained to draw the trains, which are constantly increasing in size and weight, especially as regards the passenger traffic. The company is, therefore, putting one hundred new locomotives on the line, which will be larger and stronger than any hitherto employed. They will have 17 × 24-inch cylinders, and the passenger-engines will have the same power as those designed for the freight business, with, however, the usual difference in their favor in the size of the driving-wheels. The increased power in the passenger locomotives has been rendered necessary by the constant increase in the size of the passenger trains which are now dispatched over all these trunk lines. Mr. Cooper, the superintendent of the Cleveland and Toledo division of the Lake Shore, states that it is not an uncommon occurrence for the through express at night to leave Cleveland with two baggage-cars and ten passenger-coaches, of which at least one half will be sleeping-cars filled with passengers, and drawing very heavily. The day trains carry nine and ten cars as a rule. Such trains have proved altogether too heavy loads for many of the present engines to handle with the speed required for the through business, and new locomotives are, therefore, being bought by the quantity.

The coaches run on the through trains are now of very high order, and many of the drawing-room cars and the Wagner sleepers are not surpassed by any thing in the country. On all the first-class through coaches the six-wheeled trucks are used, a vast improvement in comfort and solidity over the four-wheeled ones, although they draw somewhat more heavily and are more damaging to the rails. That they are an improvement, however, is evidenced by the fact that they are being adopted by the best railways in the country for all their first-class cars. The coaches are all provided with the Miller platform, air brakes are at the command of the engineer, and every thing which experience has suggested as tending to the safety and the comfort of the passenger is being employed. It is refreshing to contrast the enterprise and good management of the Lake Shore and our own Michigan Central line with the miserable parsimony which prevails upon so many roads.

INLAYING WOOD.—Take a piece of veneer of the wood with which you wish to inlay, mark the pattern on it carefully, cut out and shape to the mark, using very fine files to finish, shaping and tapering the edge a little; then lay the piece on the wood you want to inlay, mark round it with a fine-pointed marker, cut to the required depth, so that you can push the piece in with your finger, then glue it in; if a large piece, put on a hot caul for a while. A fine penknife blade of good quality makes a capital tool for this work.

THE New-Haven Car Company has contracted for the erection of a large paint-shop, 175 feet long, in New-Hallville, in which will be eight tracks for the reception of cars to be painted and finished. The company is building cars for the Derby and Sheepaug Valley roads, besides several roads in the West.

The National Car-Builder,

PUBLISHED MONTHLY,

BY

VOSE, DINSMORE & CO.,

1 Barclay Street, New-York,

AND

446 State Street, Chicago.

Terms, 50 cents per Annum.

Editorial Announcements.

Correspondence.—*We cordially invite the coöperation of the railroad public in affording us the material for a good mechanical paper. Articles relating to rolling stock and machinery, by those practically acquainted with those subjects, will be gratefully received. All communications must be addressed to Vose, Dinsmore & Co., No.* 1 *Barclay Street.*

The name and address of the writer must accompany all communications designed for publication.

Advertising Rates.—*For one square, or one fifth of a column,* $5 *per month, or* $50 *a year. For half a square,* $3 *per month, or* $25 *a year. Larger advertisements by special contract.*

All communications in regard to advertising should be addressed to L. F. Dinsmore, *Post-Office Box* 4055, *New-York City, who is our agent for advertising, and authorized to make contracts, collections, etc.*

Engravings and Illustrations.

We would invite the attention of Master Car-Builders and others to the advantages to be derived from publishing in The National Car-Builder *engravings designed to illustrate the various features and details of car construction, and especially such improvements as can not otherwise be clearly presented. We will procure cuts to be made in the best manner from drawings or models that may be sent us, and charge only for the cost of engraving, inserting the same in our paper with suitable descriptive details, without charge. The cuts thus made by us, or that may be sent us for use in* The National Car-Builder, *will of course be returned promptly to the owner.*

Chicago Still Lives.

Fire may retard the growth, but can not annihilate a city like Chicago. It may destroy her merchandise and crumble her palatial structures into ashes, but her essential vitality remains. Her prestige, her individuality, her mental and physical energies, are still unimpaired, and in twelve months she will be fairly on her feet again. The force and power of reaction will correspond with the shock of the sudden and overwhelming disaster. Her surroundings are unchanged. The lakes, the prairie, the great tunnel, the converging railways, and the exhaustless tributary resources of the mighty North-west, are still at her command as before. They constitute her unimpaired capital which she well knows how to use with effect. Her growth hitherto has been marvelous, so much so as to seem exceptional and anomalous; but it has been merely the index of the development of a vast and productive contiguous territory. There was no enchantment about it, although it almost seemed that such unwonted growth could not in the nature of things be a healthy one; and indeed it was not a healthy one, in so far as it led to the erection of a class of buildings that would favor the spread of a conflagration beyond all ordinary means of control. Be this as it may, Chicago will profit in the future by her experience in the past. The mushroom principle will be avoided. In the reconstruction of the city, nothing that safety requires will be sacrificed for mere appearance. Little by little the traces of the terrible scourge will be obliterated, and block after block of grand and stately buildings will mark the swift rise of the princely Chicago, that is to be.

Her name is still, as it has ever been, a synonym of energy and pluck, and we venture to predict that its triumph over the ravage of fire will be so speedy and complete as to astonish the world. Chicago has never been accustomed to do things by halves. Whenever she boasted and snapped her fingers during her exuberant growth, there was a characteristic vim about it that challenged the respect of her rivals. Her local importance was conceded as readily as if the veritable axis of the earth could plainly be seen sticking out through the prairie mud. The exultation was warranted. She has been prostrated for a day only. The event will soon be, and is already, a thing of the past, a hideous blot receding in the distance, a historical record perpetuating the story of a disaster, the blackness of whose outlines will stand in fearful contrast with the new and beautiful city which has even now begun to rise from the ruins.

Heating Passenger-Cars.

It is to be hoped that the many improved methods that are being introduced for heating passenger-cars will, sooner or later, banish from these vehicles the unsightly and dangerous traditionary stoves. As bearing upon this subject, we copy the following timely suggestions from the *Evening Post*, of this city:

"With the approach of winter and the necessity for fires, comes round the season of burning passengers alive in railway-cars. This form of manslaughter, the most disagreeable of all, can hardly be prevented as long as trains will run off the track, and the cars are heated by stoves. The railway stove, indeed, must be regarded as a malign agent if it had never set fire to a car. It overheats the upper part of the car, renders ventilation impossible, and leaves the lower stratum of air so cold that the passenger, at a time of intense frost, sits with burning brow and frozen feet from one end of his journey to the other. But when we take into the account the loss of life it entails in case of serious accident, by making a holocaust of the occupants of the train, we marvel more and more that it should not have been superseded by some better means of securing warmth and comfort.

"The employment of steam for heating private buildings, large hotels, and spacious apartments, has been attended with the best results, and there seems to be every reason why the heating of all the cars of a passenger train by steam from the boiler of the engine should be found safe, agreeable, and economical. The experiment has been tried on some of the lines running from the city, and with complete success. Nobody, of course, could be roasted alive. The steam being introduced into the bottom of the car, there is an equable and pervasive warmth, subject to exact regulation, and tempered by supplies of pure air from without. In case of accident to the car, there can be no suffocation from steam, because at the moment of leaving the track or collision with another train, the communication with the boiler will be instantly interrupted; and the use of steam has this still further to recommend it, that the car can be warmed in a very few minutes, while the supply of heat will never be exhausted so long as there is fuel enough left to propel the train.

"Two or three years ago, a patent was obtained by a gentleman of Virginia for heating passenger-cars by electricity, the exciting power to be gained from the rotation of the wheels. Experiments of a satisfactory character were made of this means of producing warmth, and it was hoped that the plan would prove eminently practicable. But difficulties of adjustment have, so far, effectually defeated the design of the inventor, and still our railway companies continue to build their cars with the demon of the stove to vitiate the atmosphere, and occasionally to roast the passengers. Let us hope that steam or electricity may soon displace the stove, so that winter shall no longer double the perils and discomforts of railway traveling."

Fast Railroad Time.

Mr. Charles Ward, of Brooklyn, furnishes the *Scientific American* with the following account of fast running between Easton and Jersey City:

"Thinking that a short account of what is being done in the United States, by men deeply interested in the motive power of our railways, and in the transportation of passengers with the utmost dispatch, and with a degree of safety approaching the maximum, I give you an account of a trip that was made over the Central Railroad of New-Jersey, on Saturday, October 7th. The train, consisting of three cars, in charge of Superintendent Ricker, drawn by engine 120, run by Chief-Engineer John Mulford, made the run coming from Easton, Pa., to Jersey City, 74 miles, in 89 minutes' running time, an average of 50 miles per hour, or at the average rate of 1 minute and 12 seconds for each mile. The distance from White-House to Somerville, 9½ miles, was run in exactly 10 minutes from a start to a dead stop. Two miles of the distance between the last-named points was up a grade of 27 feet per mile. From Somerville to Plainfield, 11¾ miles, was run in 13½ minutes; and from Plainfield to Elizabeth, 12 miles, in 12¾ minutes. This includes starting, making a full stop at Cranford, and coming to a dead stop at Elizabeth. Three miles of the distance between Plainfield and Elizabeth is an ascending grade of 30 feet per mile, up which the train flashed at the rate of 29⅓ yards between two beats of a common clock. This run is, perhaps, without a parallel on the continent of America.

"The engine, an anthracite-coal burner, is one of twelve first-class passenger-engines, built according to the specifications of Mr. Ricker, at the Baldwin Locomotive-Works, Philadelphia. Her cylinders are 15 by 22 inches, and her drivers 5 feet 2 inches over the tires. The area of the steam-ports is 16 square inches; of the exhaust ports, 32 square inches. Her valves have ¾ inch outside lap, and line and line exhaust. The throw of the eccentrics is 5 inches, with $\frac{1}{16}$ lead. The engine weighs 33 tons.

"This is taken from a true copy of the actual running time."

Our Chicago Exchanges.

Among the institutions of Chicago, none was more characteristic than her newspaper press. Energy and originality were its leading features. A temporary suspension even, of its twelve daily papers and numerous weeklies, would create an aching void that would be keenly felt; and especially would the great railroad community miss two such papers as the *Railroad Gazette* and the *Railway Review*. We are glad to be able to say, however, that in spite of the destruction of the publication offices of these excellent journals, and the severe losses incidental thereto, both have already been reissued with little apparent change in their general appearance. Such a speedy resurrection from the ashes of the great conflagration attests a spirit and energy characteristic of the modern newspaper press. The *Gazette* will for the present be published in New-York. The editorial rooms are at 72 Broadway. The *Review* is reissued in Chicago. The other leading papers of that city have nearly or quite all of them resumed publication.

The Chicago branch office of Vose, Dinsmore & Co. has been reopened at 446 State street, its former location, at 20 La Salle street, having been abandoned on the morning of the 9th ult., in consequence of the intense heat. The manager, Mr. A. L. Butler, was an individual sufferer by the conflagration, his residence and private effects having been destroyed; but with an energy and promptitude suited to the emergency, he lost no time in opening a new office in the central and eligible location above indicated, where he is now receiving fresh supplies of car-spring stock from the manufactory in New-York, which will enable him to execute orders as heretofore

Substitute for Mahogany.

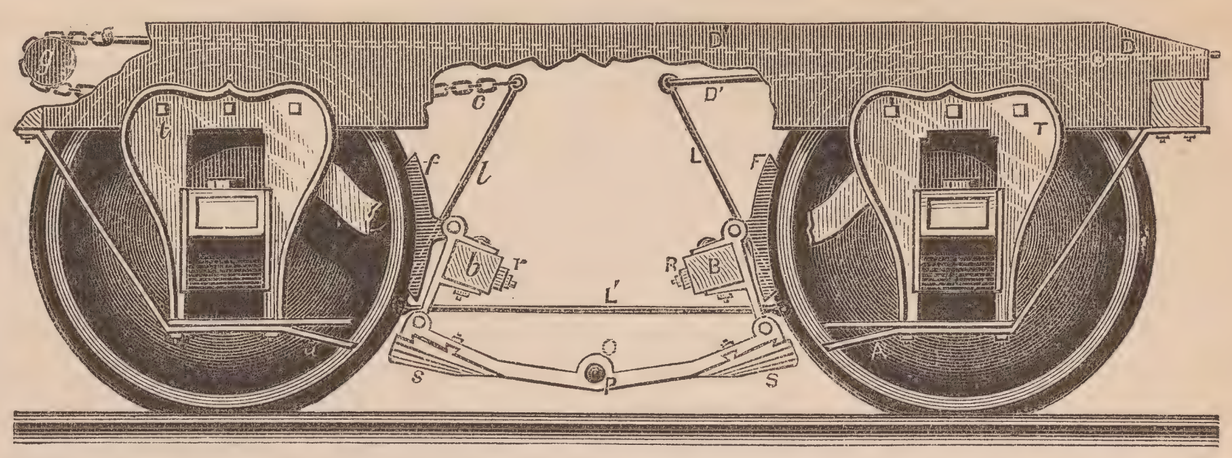
THE difficulty of procuring mahogany and other precious woods, and the consequent exorbitant prices demanded for the ordinary articles of family convenience, has occasioned the art of the chemist to be applied to a subject peculiarly calculated to promote domestic embellishment at a trifling expense. It has been contrived to render any species of wood of a close grain so nearly to resemble mahogany in the texture, density, and polish, that most accurate judges are incapable of distinguishing between this happy imitation and the native produce. The first operation, as now practiced in France, is to plane the surface so as to render it perfectly smooth; the wood is then rubbed with diluted nitrous acid, which preserves it for the materials subsequently to be applied. Afterward, one ounce and a half of dragon's blood, dissolved in a pint of spirits of wine, and one third of that quantity of carbonate of soda, are to be mixed together and filtered; and the liquid in this state is to be rubbed, or rather laid, upon the wood with a soft brush. This process is repeated with very little alteration, and in a short interval afterward the wood possesses the external appearance of mahogany. When this applica tion has been properly made, the surface will resemble an artificial mirror; but if the polish become less brilliant, by rubbing it with a little cold-drawn linseed-oil, the wood will be restored to its former brilliancy.—*Cabinet-Maker.*

Automatic Railway Signal.

HENRY S. EVANS, of West-Chester, Pa., has obtained a patent for an improved apparatus for operating railroad signals by the passing engine or train. Two signal posts are erected at a suitable distance from the track, and at least at such a distance apart that the entire train shall pass one of said posts before its forward end reaches the other post. The posts are placed upon the right hand side of the track, a separate set being used for each track upon a double-track road, and for each side of the track upon a single-track road. To the upper ends of the posts are pivoted pulleys, with which pulleys are rigidly connected the signals. One signal is a single straight signal or wing, and the other is a double signal, its parts or wings being at right angles with each other, and is designed to be used where there is a crossing. An endless chain or wire, or a combination of chains and wires, passes around the pulleys, and is so connected as not to slip upon them, so that the two signals may always be moved together. To the pulleys are also attached the upper ends of chains, the lower ends of which are attached to the outer ends of levers, which are pivoted at their inner ends to suitable supports beneath the track. Two other levers, extending in opposite directions along the right-hand rail of the track, have their outer ends pivoted to suitable supports at the side of the rail. The inner or adjacent ends of these levers are connected to the first set of levers in such a way that a train, in passing, will operate the signals gradually.

TO CLEAN BRASS.—Rub the surface of the metal with rotten-stone and sweet-oil, then rub off with a piece of cotton flannel and polish with soft leather. A solution of oxalic acid rubbed over tarnished brass soon removes the tarnish, rendering the metal bright. The acid must be washed off with water, and the brass rubbed with whitening and soft leather. A mixture of muriatic acid and alum dissolved in water imparts a golden color to brass articles that are steeped in it for a few seconds.

TO CLEAR MUDDY WATER.—A little dissolved alum is very effective in clearing muddy water. If thrown into a tub of soap-suds, the soap, curdled and accompanied by the mud particles, sinks to the bottom, leaving the water above clear and pure. In times of scarcity of water, this may be used again for washing clothes.



Patent Track Car-Brake.

THE engraving illustrates a new double-acting passenger car-brake, which acts upon both wheels and track. It is simple in construction, and can be worked by steam, air, electricity, or by hand. The wheel-brakes are the same as those already in use, but instead of being suspended from the car-body, they are hinged over an arm O, oscillating at its centre P, and provided with adjustable track-shoes S S, of a new design especially adapted for track-brakes. The whole being equally balanced, a small spring keeps it in a horizontal position; but when the ordinary brakes F f are applied to the wheels, the face of the two moving in opposite directions, raises one end of the arm O, and forces the other end down with the rear end upon the track in a dragging position, according to the direction the train may be moving, and with greater or less force according to the amount of pressure the brakeman puts upon the wheel. The practical working of this device may be illustrated by a person dragging a pole after him; he can go slow or fast over a rough or smooth surface, and bear on as hard as he likes; but if he reverses the operation by pushing the pole in front of him, instead of dragging it, he will be apt to meet impediments that will cause a sudden stop. In the application of this brake, it is impossible for the wrong shoe to get upon the track, as they are not worked by the direct and positive power of levers or chains, but entirely by the friction of the ordinary brake which travels on the surface of the wheels, and thus allows the oscillator O to adjust itself to the unevenness of the track.

It will be seen that the device is a combination of the forces of wheel and track-brake, and the power thus augmented will, it is claimed, stop a train in much less time than the methods now in use. It has been in use for several months on the Philadelphia and Erie road with very satisfactory results, and the patentee offers to fit up trial trains of three or more cars with it, and if it does not give satisfaction after three months' trial, will remove the same, and replace the old brakes without charge.

Any farther information in regard to it may be obtained by addressing Messrs. M. W. Griswold & Co., 104 Chambers street, New-York City.

Mutual Life Insurance.

THE United States Railroad Mutual Life Insurance Association held its second annual convention at Louisville, in June last. From the report of the secretary, R. D. Keen, of the Camden and Amboy Railroad, it appears that the actual membership of the association numbers 1772, representing 103 railroads, and being an increase of 1331 since April, 1870. The organization is yet comparatively in its infancy, but its progress thus far indicates careful and prudent management. The prospective increase in membership during the current year is estimated at 1000. A copy of the report may be had by addressing Mr. Keen, at Bordentown, New-Jersey.

WE are indebted to the courtesy of Mr. G. W. W. Houghton, Editor of the *Hub*, for the original drawings of the Boyall Omnibus and Traction-Engine, and also for the descriptive article accompanying the excellent engravings of the same in our present number.

Our Native Woods.

IN addition to the numerous valuable woods we import, our own forests afford some of the most magnificent specimens of fancy woods that appear in our lumber market; and which, if treated with proper care and some degree of taste, will produce furniture of great beauty. The burls of black-walnut, of the ash, and of several trees are justly appreciated, at home and abroad, for the extreme richness of their veneers; and we believe that a fortune can be secured by any party who will dig up and cut into veneers the roots of the black-walnut trees in any of the forests of the Western States. Until very recently, and in fact even to this day, to some extent, our manufacturers, more especially in the Western States, are in the habit of manufacturing sets of fine black-walnut stock, and staining them in imitation of rosewood and mahogany. But this is the fault of the customer rather than of the manufacturer. It seems to be a popular weakness, and one which we do not believe to be exclusively American, to prefer foreign goods to native; perhaps this is the reason that the fancy woods of California sell better in Europe than in America. We desire to see the day when our manufacturers and their customers will take a just pride in work produced from the beautiful woods that are indigenous to our forests, and not find it necessary to hide their beauties by a tawdry imitation of foreign wood; and when dealers will not be obliged to call a veneered panel by some incomprehensible foreign word to sell their goods, but will find it alike a pleasure and a profit to give to our American forests their just credit for producing woods of great beauty and strength.—*Cabinet-Maker.*

The Car Peddler Nuisance.

WE trust that Mark Twain will stick to it until he has succeeded in abolishing it. It is a scandal to every railroad that continues to permit its existence:

"And there were the peddlers. I bought out the popcorn boy to get rid of him, because I was trying to compose a poem for a young lady's album, and did not want to be disturbed. But he came right back with a stock of pea-nuts. I took a few and hurried him away, and he returned with some ice-cream candy. I don't like ice-cream candy and pea-nuts together; but I invested at once, because an inspired rhyme had been born to me, and I wanted to set it down before it slipped my mind. Then the scoundrel came back to me with tobacco and cigars, and afterward with oranges, imitation ivory baby-whistles, fig-paste, and apples. Then he went away and was gone some time, and I was encouraged to hope the train had run over him. He was only keeping his most malignant outrage to the last. He was getting his literature ready.

"And from that time forward that degraded youth did nothing but march from one car to another, and afflict the passengers with specimen copies of the vilest blood-and-thunder romances on earth. *The Perjurer's Doom* and *The Desperado's Revenge* were some of his milder works, and on their backs were pictures of stabbing affrays and duels, and people shoving other people over precipices, and wretched wood-cuts of women being rescued from terrible perils of all kinds, and they are always women who are so criminally homely that any right-minded man would

take a placid satisfaction in seeing them suffer sudden and violent death. But that peddler-boy peddled these atrocious books right along for hours together, and I gave up my poem at last, and devoted all my energies to driving him away, and trying to say things that would make him unhappy."

An Ingenious Device.

AN exchange describes an ingenious apparatus now in use on the Chicago, Burlington, and Quincy Road, which employs electricity as an agent to assist in filling locomotive tanks with water. The steam-pump which supplies the tank is situated on a stream half a mile distant, and entirely out of sight. A float is so arranged that, when water is drawn off more than two or three inches below the top of the tank, a circuit is closely connected by wires with the pump-house. This sets a bell ringing within hearing of the engineer, who starts the pump and runs it until the tank is full, which is duly announced by the cessation of the alarm. The application of a similar apparatus for the direction of lowness of water in stationary steam-boilers might be made, we think, to answer a good purpose, by reminding delinquent engineers of their duty before it is too late to perform it.

Facetiæ.

A capital letter—one containing a remittance.

BARNUM'S armless woman is said to write a very good foot.

AN Oregon toast over a glass of ardent: "Here's what makes us wear old clothes!"

THE young lady whose feelings were "all worked up" has ordered a fresh supply.

A MIDDLEBORO rustic "set" his watch by the gauge in a locomotive cab.

A WHOLESALE house advertises: "Wanted, women to sell on commission."

THE "embers" of the dying year—September, November, and December.

THE man who, by mistake, took a drink from a bottle of mucilage, says that he has felt "stuck up" ever since.

THE crime of jerking the hair out of your wife's head is not so sinful as it formerly was. It is just as ungentlemanly as ever, but it doesn't hurt as it used to.

AN independent Missouri girl set out to earn her own living as a telegraph operator, and in two years accumulated $200,000. It was left her by a rich uncle.

AN Irishman, fresh from the sod, and anxious to secure a humming-bird, caught a large bee instead; it stung him, and he cried out, "Houly Moses! how hot his little fut is!"

A man who inadvertently seated himself upon a lot of carpet-nails said they reminded him of the income tax.

AN eccentric clergyman lately said, in one of his sermons, that "about the commonest proof we have that a man is made of clay is the brick so often found in his hat."

A STREET-CAR dummy has been so arranged that the engine consumes its own smoke and steam. It is not the first motive-power on street railroads that has been self-consuming. Some roads employ horses that will eat themselves up in six months.

AN unsophisticated Norwegian in Northern Iowa put a pound of gunpowder in his coat-tail pocket the other day, and after taking a hearty smoke put his pipe on the top of the powder. Although it did not quite kill him, he has a sweetheart who mourns over his *awful end*.

THERE is a sharp rivalry just now in Alabama among different guano dealers. One of them, by way of showing the superiority of his guano over any other, says that a farmer recently put a sample of it into his pocket, in which there happened to be a carpet tack, and started home on horse-back. Before reaching his house, his steed broke down, and the farmer was at a loss to discover the cause until he found that the carpet tack had grown to be a long bar of railway iron.

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C. H. BASS,

EDITOR

Atlantic & Pacific Journal,

OFFICE, 24 ANN STREET,

NEW-YORK.

Car-Wheel Manufacturers.

Atlantic Iron-Works	Portsmouth, Va.
Barnum & Richardson Manufacturing Co.	Chicago, Ill.
Barney & Smith Manufacturing Co.	Dayton, Ohio.
Bass & Hanna	Fort Wayne, Ind.
Bailey, Howson & Co	St. Paul, Minn.
Davenport, Fairbairn & Co	Erie, Pa.
Dawson Manufacturing Co	Dawson, Ga.
Detroit Car-Wheel Works	Detroit, Mich.
Fulton Foundry Co	Cleveland, Ohio.
Gill & Bidwell	Allegheny City, Pa.
Green, D. P. & Co	St. Louis, Mo.
Harrisburg Car Manufacturing Co	Harrisburg, Pa.
Jackson & Woodin	Berwick, Pa.
John L. Gill	Columbus, Ohio.
Lobdell Car-Wheel Works	Wilmington, Del.
Missouri Car and Foundry Co	St. Louis, Mo.
Moore Elastic Car-Wheel Co	Jersey City, N. J.
Mowry Car and Wheel Works	Cincinnati, Ohio.
Ohio Falls Car Co	Jeffersonville, Ia.
Pettengill, Glass & Co	Cleveland, Ohio.
Quealey, W. J	Hannibal, Mo.
Ramapo Wheel & Foundry Co	Ramapo, N. Y.
Scoville, J. & N. C	Buffalo, N. Y.
St. Louis Car-Wheel Co	St. Louis, Mo.
Taylor Iron Works	High Bridge, N. J.
Thompson, Douglas	Bordentown, N. J.
Tredegar Company	Richmond, Va.
Toronto Car-Wheel Co	Toronto, Can.
Washburn, Hunts & Co	Jersey City, N. J.
Washburn Car-Wheel Manufacturing Co	Worcester, Mass.
Wason Manufacturing Co	Springfield, Mass.
Whitney & Sons	Philadelphia, Pa.
Woodbury & Company	E. Cambr'ge, Mass.
Wyoming Valley Manufacturing Co	Wilkesbarre, Pa.

Locomotive Builders.

Baldwin Locomotive Works	Philadelphia, Pa.
Brooks Locomotive Works	Dunkirk, N. Y.
Danforth & Cooke	Paterson, N. J.
Dickson Manufacturing Co	Scranton, Pa.
Grant Locomotive Works	Paterson, N. J.
Hinckley & Williams	Boston, Mass.
Manchester Locomotive Works	Manchester, N. H.
Mason, William	Taunton, Mass.
McKay Iron and Locomotive Works	Jersey City, N. J.
Portland Company	Portland, Me.
Pittsburg Locomotive Works	Pittsburg, Pa.
Rogers Locomotive Works	Paterson, N. J.
Rhode Island Locomotive Works	Providence, R. I.
Schenectady Locomotive Works	Schenectady, N. Y.
Porter, Bell & Co. (light locomotives)	Pittsburg, Pa.
Taunton Locomotive Works	Taunton, Mass.

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Albany & Susquehanna	R. C. Blackall	R. C. Blackall	Albany, N. Y.
Atlantic & Great Western			Kent, Ohio.
Atlantic & Gulf	C. Collins	J. Sullivan	Savannah, Ga.
Alexandria & Fredericksburg			Alexandria, Va.
Alabama & Chattanooga	H. M. Smith	H. M. Smith	Chattanooga, Tenn.
Atlantic & North-Carolina	E J. Clayton	E. J. Clayton	New-Berne, N. C.
Atlanta & West-Point	Wm. Rushton		Atlanta, Ga.
Atlanta & West-Point	R. D. Cole		Newnan, Ga.
Atlantic & Pacific	John Hewitt	John Hewitt	Franklin, Mo.
Allegheny Valley	G. W. Glass	R. Gunning	Pittsburg, Pa.
Androscoggin	Ira K. Russell	C. S. Greenwood	Farmington, Maine.
Adirondack			Saratoga, N. Y.
B			
Bangor, Old Town & Milford	J. B. Peckham	John H. Brown	Bangor, Maine.
Bennington & Rutland	John Haining		Rutland, Vt.
Baltimore & Ohio	John C. Davis	John C. Davis	Baltimore, Md.
Bellefonte & Snow Shoe	H. D. Landis	H. D. Landis	Bellefonte, Pa.
Belvidere Delaware	R. McDowell	John Silvers	Lambertville, N. J.
Boston & Albany	Wilson Eddy	F. D. Adams	Springfield, Mass.
Boston & Albany	A. B. Underhill	W.E.Chamberlain	Boston, Mass.
Boston & Providence	George Richards	John Lightner	Roxbury, Mass.
Boston, Clinton & Fitchburg	John Webster	Samuel Stevens	Fitchburg, Mass.
Boston, Concord & Montreal	R. Adams	M. R. Elkins	Lake Village, N. H.
Boston & Maine			Boston, Mass.
Boston & Maine		D. C. Richardson	Lawrence, Mass.
Boston & Lowell & W. L.	L. R. Winslow	S. A. Davis	Boston, Mass.
Blossburg & Corning	O. C. Patchell	O. C. Patchell	Corning, N. Y.
Brockville & Ottawa	Joseph Cockfield	Joseph Cockfield	Brockville, Can.
Blue Ridge			Anderson, S. C.
Burlington & Missouri River	G. Chalender	G. Chalender	Burlington, Iowa.
Burlington, Cedar Rapids & Minn	Wm. Swanston	Wm Swanston	Cedar Rapids, Iowa.
Buffalo & Washington			Buffalo, N. Y.
Boston, Hartford & Erie	Geo. Hayden	Elias Pratt	Boston, Mass.
Buffalo, Corry & Pittsburg	Thomas Connell	Thomas Connell	Corry, Pa.
Buff. Bayou, Brazos, Colorado	E. Perry	M. Borst	Harrisburg, Tex.
C			
California & Pacific	O. R. Ford	D. Rutherford	Vallejo, Cal.
Camden & Amboy	F. B. Stevens		Hoboken.
	T. T. Kerr	E. Lockwood	Bordentown, N. J.
	Thomas Single		South-Amboy.
Camden & Atlantic	E. Collings	S. Wills	Camden, N. J.
Catawissa	A. J. Prescott	G. P. Fenstermacher	Catawissa, Pa.
Cape Cod	E. A. Walker	William Cannon	Hyannis, Mass.
Calais & Baring	Chas. W. Butler	Chas. W. Butler	Milltown, Me.
Catasauqua & Fogelsville	Thomas Evans	Chas. S. Holbach	Catasauqua, Pa.
Carrolton & Oneida	M. T. Wiggins		Carrolton, Ohio.
Charleston & Savannah	H. T. Calder		Charleston, S. C.
Chesapeake & Ohio	W. G. Freeman	J. N. King	Richmond, Va.
Cheraw & Darlington	D. W. Haines		Florence, S. C.
Champlain Trans. Co	H. T. Calder		Burlington, Vt.
Cheshire	F. A. Perry	F. A. Perry	Keene, N. H.
Charlotte, Columbia & Augusta	Robert King	J. Q. Leats	Columbia, S. C.
Chicago & North-western		Thomas Hull	Chicago, Ill.
Wiscon. Mad. & Mill. Divis		Henry Hull	Fond du Lac, Wis.
Galena Division	R. W. Bushnell	Hugh Gray	Chicago, Ill.
Chicago	T. B. Tilton		
Chicago & N. W. Iowa Division	C. C. Elliott	William Campbell	Clinton, Iowa.
Chicago & N. W. Peninsula Division	S. L Pierce		Escanaba.
Chicago & Alton	John A. Jackman	R. Reniff	Bloomington, Ill.
Chicago, Burlington & Quincy	C. F. Jauriet	W. W. Wilcox	Aurora, Ill.
Chicago, Cincinnati & Louisville	C. F. Kidder	D. B Howe	La Porte, Ind.
Chicago, Rock Island & Pacific	T. B. Twombly	B. K. Verbryck	Chicago, Ill.
Chicago, Michigan & Lake Shore	E. I. Reynolds		St. Joseph, Mich.
Cleveland, Col., Cin., & Indianapolis	L. S. Young	William F. Smith	Cleveland, Ohio.
Cleveland and Pittsburg	N. E. Chapman	N. E. Chapman	Cleveland, Ohio.
Cleveland, Mt Vernon & Delaware	J. W. Holloway	J. W. Holloway	Akron, Ohio.
Cincinnati, Hamilton & Dayton	William Cullen	W. H. Allison	Cincinnati, Ohio.
Cincinnati & Zanesville	Peter Green	D. J. Jewell	Lancaster, Ohio.
Cincinnati & Indianapolis Junction	J. H. Keith	W. W. Degnacey	Cambridge, Ind.
Cincinnati, Sandusky & Cleveland	John T. Beatty	William Earick	Sandusky, Ohio.
Columbus, Chicago & Indiana Central	(See Pitts. Cinn. & St. Louis)		
Concord	E. Studley	M. W. Dickerman	Concord, N. H.
Concord & Claremont	J. N. Lander	A. Langmaid	Concord, N H.
Connecticut River	John Mulligan	R. Hitchcock	Springfield, Mass.
Contoocook River			Concord, N. H.
Conn. & Passumpsic Rivers	Horace Alden	Horace Alden	Lyndon, Vt.
Cumberland Valley	A. S. Hull	C. W. Nitterhouse	Chambersburg, Pa.
Cumberland & Pennsylvania	W. L. Jordan	J W. Sauerbach	Mt. Savage, Md
Central of Georgia	B. L. Boulineau	C. C. Millar	Savannah, Ga
Central of New-Jersey	†T. W. Peeples	George Hackett	Elizabethport, N. J.
Central Branch Union Pacific	Wm. D. Rowley		Atchison, Kansas.
Central R. R. of Iowa	W. J. Ribley	W. J. Ribley	Eldora, Iowa
Central Pacific	A. J. Stevens	Benjamin Welch	Sacramento, Cal.
D			
Dayton & Union	A. J. Keenan	J. F. Feicht	Dayton, Ohio.
Danbury & Norwalk	Charles A. Craig	Wm. W. Bedient	Danbury, Ct.
Dayton & Michigan	William Cullen,	W. H. Allison	Cincinnatti, Ohio.
Delaware, Lackawanna & Western	Walter Dawson	Robert McKenna	Scranton, Pa.
Des Moines Valley	James Lamb	R. E. Smith	Keokuk, Iowa.
Detroit & Milwaukee	B. Briscoe	B. Briscoe	Detroit, Mich.
Delaware & Hudson Canal Co	James Dickson	Thomas Orchard	Carbondale, Pa.
Dorchester & Delaware			Cambridge, Md.
Dubuque South-western			Farley, Iowa.
Dutchess & Columbia			Washington, N. Y.
E			
Eastern		J. P. Somerby	Salem, Mass.
Eastern	John Thompson		East-Boston, Mass.
East-Tennessee & Virginia	Jos. Armbruster	Jos. Armbruster	Knoxville, Tenn.
East-Tennessee & Georgia	Eli Hixon		Knoxville, Tenn.
East-Pennsylvania	J. M. Geary	Samuel Reeves	Reading, Pa
Erie Railway	*E. O. Hill		Susquehanna, N. Y.
Erie Railway	James B. Gregg		
Erie Railway	H. L. Brown	C. A. Smith	Jersey City, N. J.
Erie Railway	M. E. Brown	M. Wilder	Buffalo, N. Y.
Erie Railway	W. E. Cooper	W. E. Cooper	Hornellsville, N. Y.
Erie Railway		W. E. Rutter	Elmira, N. Y
Evansville & Crawfordsville	John L. White	A. Sharra (fore'n)	Evansville, Ind.
Evansville, Henderson & Nashville	Jos. Crawford	W. H. H. Price	Nashville, Tenn.
European & North Am. (of Maine)	A. O. Bailey	J. H. Brown	Oldtown, Maine.
Erie & Pittsburg	John Young	John Young	Erie, Pa.
Eldora			Dubuque, Iowa.
F			
Florida	A. W. Taylor	G. Hernandez	Fernandina, Fla
Flint & Pere Marquette	Sanford Keeler	Sanford Keeler	East-Saginaw, Mich.
Fitchburg	Geo. A. Cooledge	Enos Varney	Charlestown, Mass.
Fitchburg & Worcester	John Webster	Samuel Stevens	Fitchburg, Mass.
G			
Grand Trunk	*Richard Eaton	J. W. W. McWood	Montreal, Canada.
Galveston, Houston & Henderson	Wm. Macbeth	Wm. Macbeth	Galveston, Texas.
Grand River Valley		James Potts	Jackson, Michigan.
Grand Rapids & Indiana			Fort Wayne, Ind.
Great Western of Canada	*Wm. A. Robinson		Hamilton, Canada.
Georgia	William Hardman	T. M. Preval	Augusta, Ga.
Greenville & Columbia	J. T. Price	J. T. Price	Helena, S. C.
H			
Hanover Branch	John J. Bingley	Henry Britcher	Hanover, Pa.
Hartford & New-Haven	N. Slingland	F. Leppense	Hartford, Ct.
Hannibal & St. Joseph	H. A. Towne	H. C. Whiting	Hannibal, Mo.
Hartford, Providence & Fishkill	Edwin Garfield	V. D. Perry	Hartford, Ct.
Hackensack & New-York	Abra'm Angausen		Hackensack, N. J.
Hastings & Dakota	C. C. Clements		Hastings, Minn.
Housatonic	C. R. Morris	J. Ferris	Bridgeport, Ct.
Houston & Texas Central	A. W. Scoble	J. H. Bell	Houston, Texas.
Houston Tap & Brazoria	A. Malsch	R. H. Yeomans	Houston, Texas.
Huntington & Broad-Top Mountain	D. G. Gilchrist	M. Tellerhoof	Saxton, Pa.
Hempfield	T. Marsh		Wheeling, Va.
Hudson River	Wm. Buchanan	John McKenna	New-York.
Hudson River	John Dykeman	Charles D. Mills	East-Albany, N. Y.
Houston & Great Northern		J. H. Bell	Houston, Texas.
I			
Indianapolis, Cicinnnati & Lafayette			Cincinnati, Ohio.
Indianapolis, Peru & Chicago	John McKenna	John McKenna	Peru, Ind.
Illinois Central	S. J. Hayes	H. O. Wadlie	Chicago, Ill.
Iowa & Missouri State Line			Farmington, Iowa.
Iron	Perry Scott	Clem. Roetling	Ironton, Ohio.
Indianapolis & St. Louis	C. E. Benton	C. E. Benton	Mattoon, Ill.
Indianapolis, Bloomington & Western	J. T. Otis	S. S. Smith	Urbana, Ill.
Ionia & Lansing	H. Loughlin		Lansing, Mich.
J			
Jeffersonville, Madison & Indiana	Reuben Wells	John Higgins	Jeffersonville. Ind.
Jackson, Lansing & Saginaw	Andrew Wilson	A. Wilson	Jackson, Michigan.
K			
Keokuk & St. Paul	P. R. Sutton	Wm. McElroy	Keokuk, Iowa.
Knox & Lincoln			Bath, Maine.
Kentucky Central	J. R. Ledyard	J. L. Hackenthorn	Covington, Ky.
Knoxville & Charleston			Knoxville, Tenn.
Kansas Pacific	Geo. W. Cushing	Geo. W. Cushing	Wyandotte, Kansas.
Kalamazoo, Allagan & Grand Rapids			Kalamazoo, Mich.
Kansas City, St. Joseph & Council Bluff	H. L. Cooper	J. B. Barbour	St. Joseph, Mo.
L			
Lake Erie & Louisville	John Pero		Fremont, Ohio.
Lackawanna & Bloomsburg	Chas. Graham		Kingston, Pa.
Lebanon Springs			Burlington, Vt.
Lehigh Valley	J. Kinsey		South-Easton, Pa.
Lehigh Valley	P. Hofecker	E. R. Brown	Weatherly, Pa.
Lehigh Valley	A. Mitchell	Mauch Chunk, Pa.	Delano, Pa.
Lehigh Valley	D. Clark		Hazelton, Pa.
Lehigh & Susquehanna	L. C. Brastow	L. C. Brastow	Wilkesbarre, Pa.
Lehigh & Susquehanna	Wm. H. Brown		Mauch Chunk, Pa.
Leavenworth, Lawrence & Gal	S. Philbrick		Lawrence, Kansas.
Lewy's Island	C. W. Button	Damase Merceir	Milltown, Maine.
Little Rock & Fort Smith			Little Rock, Ark.
Little Miami	J. H. Setchel		Cincinnati, Ohio.
London & Port Stanley			London, C. W.
Louisville, New-Albany & Chicago	Jacob Losey	Jacob Losey	New-Albany, Ind.
Long Island	Chs. A. Thompson	B. T. Little	Hunter's Point, L.I.
Louisville, Cincinnati & Lexington	John Skidmore	Theo. G. Shaw	Louisville, Ky.
Louisville & Nashville	Thatcher Perkins	Thatcher Perkins	Louisville, Ky.
Lake Shore & Michigan Southern	†James Sedgley	§John Kirby	Cleveland, Ohio
Michigan Southern Division	William Hill		Elkhart, Ind.
" " "		D. Sutherland	Adrian, Mich.
Toledo Division	Geo. H. Fier	Frank O. Bray	Norwalk, Ohio.
Erie Division	L. O. Gassett	J. Withy Acombe	Cleveland Ohio.
Buffalo Division	B. H. Kidder	J. N. Mileham	Buffalo, N. Y.
M			
Marquette & Ontonagon	A. P. Burroughs	H. D. Lyons	Marquette, Mich.
Macon & Augusta			Macon, Ga.
Maine Central	J. W. Philbrick	J. W. Philbrick	Waterville, Me.
Macon & Western	B. Pope Freeman	James A. Knight	Macon, Ga
Manchester & Lawrence	Edward Studley	M. W. Dickerman	Concord, N. H.
Macon & Brunswick	M. Thornton	M. Thornton	Macon, Ga.
Maysville & Lexington			Maysville, Ky.
Marietta & Cincinnati	E. Bosley	E. Bosley	Chillicothe, Ohio.
Memphis, Clarksville & Louisville			Clarksville, Tenn.
Memphis & Little Rock	N. Greener	C. W. Wooldridge	Huntsville, Ark.
Memphis & Charleston	Michael Burk	A. W. Drew	Memphis, Tenn.
Memphis & Charleston	L. M. Sellars	Fabien Varin	Huntsville, Ala.
Miami, Col. & Xenia	J. H. Setchel	M. P. Ford	Cincinnati, Ohio.
Mineral Point	Robert Hay		Mineral Point, Wis.
Mississippi & Tennessee		Henry Teague	Memphis, Tenn.
Mississippi Central	Henry Gibbon	John E. Becton	Water Valley, Miss.
Maryland & Delaware	Samuel Peters		Greensboro, Md.
Mississippi, Gains. & Tus			Gainsville, Ala.
Midland Pacific			Nebraska City, Neb.
Milwaukee & St. Paul	T. S. Davis	Wm. E. Kettridge	Milwaukee, Wis.
Milwaukee & St. Paul		John Baillie	Milwaukee, Wis
Milwaukee & St. Paul	J. Pattee	D. F. Wilson	Minneapolis, Minn.
Michigan Central	A. S. Sweet, Jr	J. B. Sutherland	Detroit, Mich.
Montgomery & West-Point	J. McVey	W. H. Daniels	Montgomery, Ala.
Montgomery & Eufaula	James McCann	I. E. Holmes	Montgomery, Ala.
Mobile & Montgomery	James McFarland	L. Barham	Montgomery, Ala.
Mobile & Girard	William Eyles	A. J. Nix	Girard, Ala.
Mobile & Ohio	L. J. Fleming	John McHugh	Mobile, Ala.
	B. S. Skates	B. S. Skates	Whistler, Ala.
Missouri River, Fort Scott & Gulf	John S. McCrum		Kansas City, Mo
Missouri, Kansas & Texas	C. T. McIlvaney	J. Townsend	Sedalia, Mo.
N			
Nashville & Chattanooga	John U. Eastman	J. G. Sawyer	Nashville, Tenn.
Nashville & Decatur	C. B. Knowles	C. B. Knowles	Nashville, Tenn.
New-Bedford & Taunton	Robert Chase	Robert Chase	New-Bedford, Mass.
New-Canaan			New-Canaan, Ct.
New-Brunswick & Canada	T. Armstrong	T. Armstrong	Saint Andrew's N.B.
New Haven & Northampton	Henry Fox	Henry Fox	Westfield, Mass.
New-York & Oswego Midland	Wm. H. Griggs	Wm. H Griggs	Oswego, N. Y.
New-York & Harlem	Wm. M. Strong	Leander Garey	New-York.
New-York Central	* C. T. Ham	Joseph Jones	Albany, N. Y.
New-York Central	G. B. Van Vorst		Albany, N. Y.
New-York Central	Henry Watkeys		Syracuse, N. Y.

* General Master Mechanic. † Mechanical Engineer.

* Mechanical Superintendent. † General Master Mechanic.
‡ General Master Mechanic and Master Car-Builder. § General Master Car-Builder.

Railroad.	*Master Mechanic.*	*Master Car-Builder.*	*Residence.*
New-York Central	Amos Gould		Rochester, N. Y.
New-York Central		Wm. Johnson	Buffalo.
New-York & Flushing			Flushing, L. I.
New-York, Providence & Boston	Jas. H. Anderson	Jas. H. Anderson	Providence, R. I.
New-York & New-Haven	H. Kittendorf	M. C. Andrews	New-Haven, Ct.
New-London Northern	J. W. Dow	S. W. Caulkins	New-London, Ct.
New-Jersey & Transportation Co	John Headden	David H. Baker	Jersey City, N. J.
New-Jersey Southern	Rufus Blodgett	H. A. Webster	Manchester, N. J.
New-Haven & Derby			New-Haven, Ct.
New-Orleans, Opelousas & Gt. Western	John McCluskey	Matthew Nolan	Algiers, La.
New-Lisbon			Leetonia, Ohio.
New-Orleans & Ohio	John R. Jordan	John R. Jordan	Paducah, Ky.
New-Orleans, Jackson & Gt. Northern	John Conlon	Charles Bartine	New-Orleans, La.
New-Haven, Hartford & Springfield			Hartford, Ct.
Naugatuck		George W. Gray	Bridgeport, Ct.
Newark & Bloomfield	Luke F. Tronson		Hoboken, N. J.
Nova Scotia	W. Johnson		Bedford, N. S.
North-Missouri	John Calhoun	C. S. Buck	St. Louis, Mo.
North-Carolina	E. Wade	B. G. Sergeant	Co. Shops, N. C.
New-Orleans, Mobile & Texas	Josiah Bettis	Josiah Bettis	Mobile, Ala.
Northern Central	C. M. Lewis		Baltimore, Md.
Northern Central		G. W. Demarest	York, Pa.
North-Lebanon		Henry B. Oves	Lebanon, Pa.
North-Pennsylvania	Franklin Roop	Franklin Roop	Philadelphia, Pa.
North-Eastern	D. W. Haines	A. M. Corrie	Florence, S. C.
Northern	James W. Lander	Albert Langmaid	Concord, N. H.
Northern of New-Jersey	T. W. Demarest		New-York.
Norwich & Worcester	Richard Colburn	G. R. Bentley	Norwich, Ct.
Northern of Canada	James W. Forster		Toronto, Can.
Norfolk & Petersburg	J. S. Whitworth	J. S. Whitworth	Norfolk, Va.
Northern Pacific	Geo. W. Cushing		Duluth, Minn.

O

Ogdensburg & Lake Champlain	William A. Short	J. R. Ames	Malone, N. Y.
Oswego & Syracuse		J. H. Parker	Oswego, N. Y.
Ohio & Mississippi		M. M. Martin	Cochran Shops, Ind.
Old Colony & Newport	J. K. Taylor	A. Gleason	Boston, Mass.
Orange, Alexandria & Manassas	James E. Waddy	John T. Nalls	Alexandria, Va.
Oil City & Pithole	George Thompson		Pithole, Pa.
Oil Creek & Alleghany River	J. S. McElroy	Jacob Williams	Corry, Pa.
Oil Creek & Alleghany	H.J.Bookhammer	John Monks	Oil City, Pa.

P

Panama	Chas. E. Stewart	J. G. Wilson	Aspinwall, N. G.
Pacific of Missouri	Jacob Johann	Jacob Johann	St Louis, Mo.
Paterson & Newark			Paterson, N. J.
Pennsylvania	* Isaac Dripps		Altoona, Pa.
Pennsylvania	H. D. Garrett	I. W. Van Houten	W. Philadelphia, Pa.
Pennsylvania	M. A. Shattuck	Samuel W. Myers	Harrisburg, Pa.
Pennsylvania	T. W. Worsdell	John P. Levan	Altoona, Pa.
Pennsylvania	D. O. Shaver	R. S. Ramsey	Pittsburg, Pa.
Philadelphia & Erie	T. J. Hamer	George J. Mason	Sunbury. Pa.
	W. L. Foster	Robt.M.Messimer	Renovo, Pa.
	W. L. Holman	Wm. P. Newcomb	Kane, Pa.
	W. T. Smith	John Quigley	Erie, Pa.
Philadelphia, Wilmington & Baltimore	George W. Perry	George W. Perry	Wilmington, Del.
Philadelphia & Reading	John Wootten	Aaron Steinbach	Reading, Pa.
Philadelphia, Germ'n & Norris'n	John Moyer	Nathan Pawling	Philadelphia, Pa.
Philadelphia & Baltimore Central	S. D. Danfield	SamuelD.Danfield	Chester, Pa.
Pittsburg, Cincinnati & St. Louis	James Ball	James Ball	Logansport, Ind.
	Robert Curtis	Theo. Chamberlain	Columbus, Ohio.
	Thomas Denmead		Dennison, Ohio.
	Thomas V. Losee	John Gottschall	Indianapolis, Ind.
		James McGee	Steubenville, Ohio.
Pittsburg, Fort Wayne & Chicago	S. M. Cummings	John Marquis	Alleghany, Pa.
Pittsburg, Fort Wayne & Chicago	J. M. Boon	Wm. Waddington	Fort Wayne, Ind.
Pittsburg & Connellsville	D. P. Rennie	J. M. Rutter	Connellsville, Pa.
Peoria, Pekin & Jacksonville	R. F. Hurd	R. F. Hurd	Pekin, Ill.
Peninsular			Battle Creek, Mich
Portland & Rochester	Jas. S. Drake	Samuel Dean	Portland, Me.
Portland & Kennebec	John Ellis	J. W. Trussel	Augusta, Me.
Portland & Oxford Central	Geo. W. Battles	Geo. W. Battles	Buckfield, Me.
Portland, Saco & Portsmouth	John Donnell		Portland, Me.
Port Royal			Beaufort, S. C.
Port Hope, Lindsay & Beaverton	H. G. Taylor	H. G. Taylor	Port Hope, Can.
Port Huron & Lake Michigan			Port Huron, Mich.
Providence, Warren & Bristol	Rufus Smith	J. Brightman	Bristol, R. I.
Portsmouth, Gt. Falls & Monmouth	James Tucker	E. Fall	Union Village, N.H.
Petersburg	R. B. Adams	Alex. Wright	Petersburg, Va.
Providence & Worcester	Joseph Kelly	Olney L. Smith	Providence, R. I.
Peninsular R. R	T. G. Templeton		Battle Creek, Mich.

R

Raleigh & Gaston	J. B. Gayle	J. B. Gayle	Raleigh, N. C.
Rensselaer & Saratoga	W. B. Gage		Troy, N. Y.
Richmond, Fredericksburg & Potomac	H. Kuhn	W. H. Trainham	Richmond, Va.
Richmond Danville & Piedmont	John McFarland	H, Longest	Richmond, Va.
Richmond & Petersburg	John O'Brien	J. J. Martin	Richmond, Va.
Richmond & York River			Richmond, Va.
Rome, Watertown & Ogdensburg	Wm. Jackson	H. H. Sessions	Rome. N. Y.
Reading & Columbia	B. Van Lew		Columbia, Pa.
Rome, Georgia	O. W. Harbin	O. W. Harbin	Rome, Ga.
Rochester & Genesee Valley	M. E. Brown	M. Wilder	Buffalo, N. Y.
Rockford, Rock Island & St. Louis	R. D. Grant		Beardstown, Ill.
Rock Island & Peoria			Rock Island, Ill.
Rutland	N. L. Davis	M. M. Crooker	Rutland, Vt.

S

San Francisco & San José	R. B. Bishop	Frank Bellisle	San Francisco, Cal.
St. Croix & Lake Superior			New-York City.
St. Lawrence & Ottawa	Calvin Dame	Calvin Dame	Prescott, Canada.
St. Paul & Pacific	C. N. Parker, Jr	C. N. Parker, Jr.	St. Paul. Minn.
St. Louis & Iron Mountain	O. A. Haines	Oscar Doolittle	Carondelet, Mo.
Sandusky, Mans. & Newark		Charles Scoeby	Sandusky, Ohio.
St. Joseph Valley			Kalamazoo, Mich.
San Antonio & Mexican Gulf	W. T. Bingham		Victoria, Texas.
South Side of Long Island			New-York.
St. Paul & Sioux City	Jas. G. Butterfield		Shakopee, Minn.
St. Louis, Vandalia, T. Haute & Ind.	C. R. Peddle	H. Kermise	Terre Haute, Ind.
South-Carolina	W. B. Smith	John Reed	Charleston, S. C.
South-Side of Virginia	J. T. Robinett	J. T. Robinett	Petersburg, Va.
South & North-Alabama	Tho. Jeffries	Tho. Jeffries	Lime Station, Ala.
Southern Minnesota	Wm. Lininger		Hokah, Minn.
South-Western of Georgia	C. D. Wall	F. H. Alley	Macon, Ga.
South Shore	Warren E. Ray		Cohasset, Mass.
Stanstead, Shefford & Chambly	W. H. Smith	M. Sessions	Waterloo, C. E.
Schuylkill & Susquehanna	John E. Wootten	John E. Wootten	Reading, Pa.
Seaboard & Roanoke	J. B. Pendleton	J. B. Pendleton	Portsmouth, Va.
Stonington & Providence	J. H. Anderson	J. H. Anderson	Providence, R. I.
Selma, Rome & Dalton	A. G. Maynes	W. W. Peirce	Selma, Ala.
Sioux City & Pacific	Charles Foster	J. R. Dow	Missouri Val.,Iowa.
Spartanburg & Union	J. N. Benner	Jacob Rice	Union C. H., S. C.
Sheboygan & Fond du Lac	J. H. Erwin	J. H. Erwin	Sheboygan, Wis.
Sullivan & Erie			Tonawanda, Pa.
Syracuse & Binghamton, N. Y.	B. G. Merrill	B. G. Merrill	Syracuse, N. Y.
Sycamore & Cortland			Sycamore, Ill.
St. Louis & South-Eastern	C. B. Salisbury		Mt. Vernon, Ill.

* Superintendent of Motive Power and Machinery.

Railroad.	*Master Mechanic.*	*Master Car-Builder.*	*Residence.*
T			
Taunton Branch			Taunton, Mass.
Tioga	Peres Bonny	D. H. Stratton	Blossburg, Pa
Texas & New-Orleans	R. B. Baer		Houston, Texas.
Tennessee & Pacific	William McKeand	William McKeand	Nashville, Tenn.
Toledo, Wabash & Western	W. F. Ray		Fort Wayne, Ind.
Toledo, Wabash & Western		David Hoit	Toledo. Ohio.
		T. G. Gorman	Springfield, Ohio.
Toledo, Peoria & Warsaw	A. H. De Clerq	R. M. Hemphill	Peoria, Ill.
Troy & Bennington			Troy, N. Y.
Troy & Boston	Foster Church	R. V. Coon	Troy, N. Y.
Toronto	Grey & Bruce		Toronto, Can.
U			
Union Pacific	I. H. Congdon	Geo. E. Stevens	Omaha, Nebraska.
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Vineland			Vineland, N. J.
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Vermont & Massachusetts	D. T. Davis	Jacob Marsh	Fitchburg, Mass.
Vermont Valley			Rutland, Vt.
W			
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Warwick Valley			Warwick, N. Y.
Wicomico & Pocomoke			Berlin, Md.
Wilmington, Charlotte & Rutherford	W. A. Gill	Thomas Myers	Laurenburg, N. C.
Wilmington, Columbia & Augusta	George Hall	W. J. Calais	Wilmington, N. C.
Winchester & Potomac			Winchester, Va.
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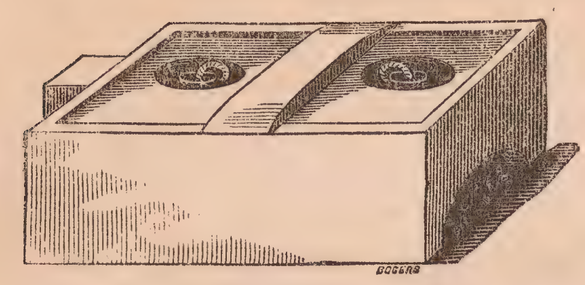

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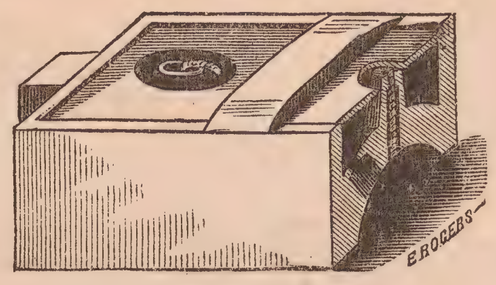

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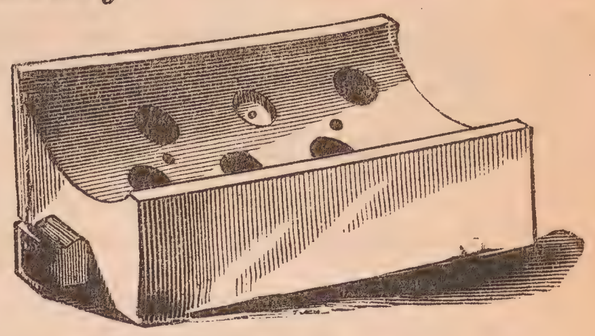

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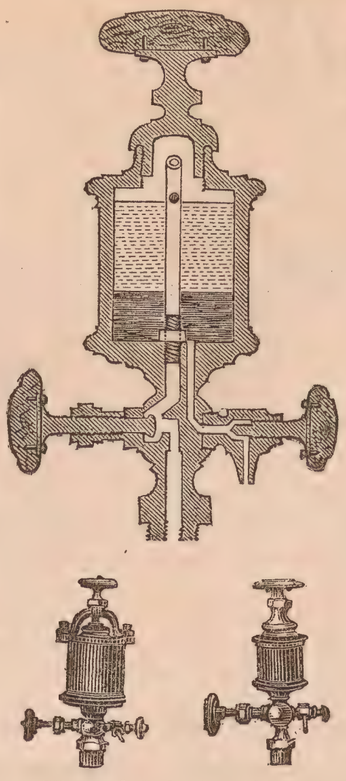

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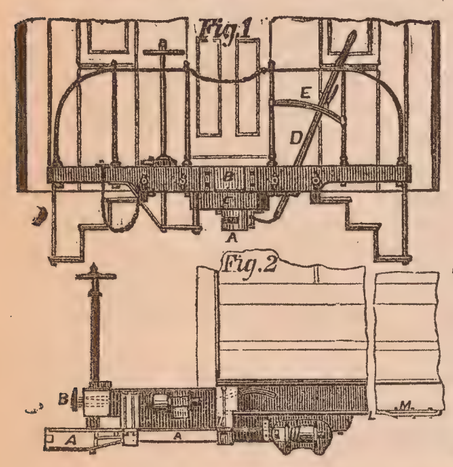

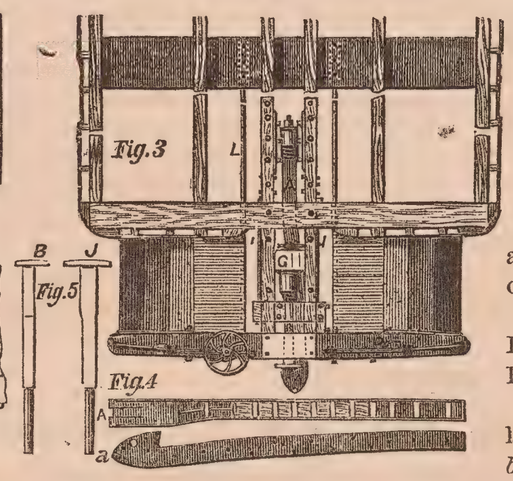

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DESCRIPTION.

Figure 1 is an elevation; Figure 2, a longitudinal section; Figure 3, a plan of an end of a car to which the arrangement has been applied; and Figures 4 and 5 show top and side views of the "Hook" and "Buffer," drawn on a larger scale than that of Figures 1, 2, and 3.

The letters refer to the same parts in all the figures. A is the coupling "Hook," B the "Buffer," C the "Stop," D the "Lever," E the "Quadrant Ratchet," F the "Truss Beam," G the "Spring Beam," H the "Suspender Beam," I the "Upward Trusses," K the "Main Spring," L the "Downward Trusses," and M the "Bolster."

The Platforms, instead of being located below the centre line of the main sills of the cars, are placed *in* that line, and held there by the Trusses I and L, so that the point of contact (in Buffers B) is *in* the said centre line and *not below* it.

The coupling "Hook" A is attached to the draw spring the same as the ordinary draw head, and at the same height above the track, but in such a manner that the outer end is free to move laterally for a short distance. The Coupling Hook projects beyond the platform. The Stop C is placed under the Buffer Beam to prevent accidental uncoupling. When two cars are brought together, the Coupling Hooks, from *their shape*, push each other aside, until the Buffers B are compressed hard on the Buffer Springs, then—*the points of the hooks having passed each other sufficiently far*—the Hooks are carried forward by their main-springs, and thus the "*Coupling*" and "*Compression*" are both effected automatically *and at the same time*, and without the use of links and pins. When two cars are thus coupled together, the *head* of the *Hook* of each car is under the Buffer Beam of its opposite car, and the platforms are close together, (about 4 inches apart.) The effect of this is, *one platform can not be forced over the other*, nor can a *child* fall between the platforms; the dust and rain are nearly all shut out; the "Compression" makes the train run steadily, and prevents all jerking at starting and stopping.

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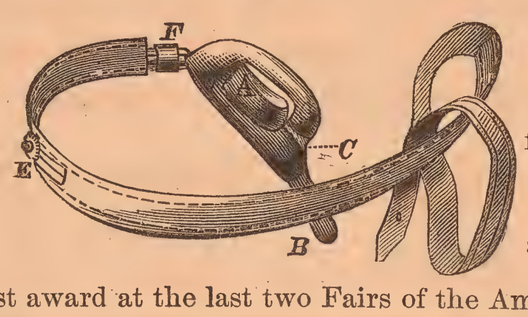
B, Perineal Clasp, for retaining Pad in position.



C, Groove for Spermatic Cord.

E, Hinge and Eccentric Wheel, for regulating pressure of the Spring.

F, Device for adjusting Pad with accuracy.

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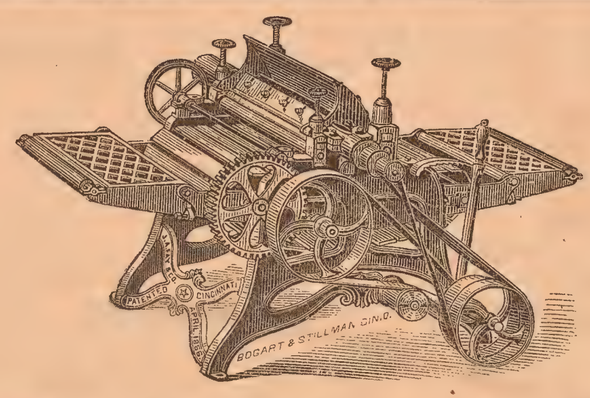

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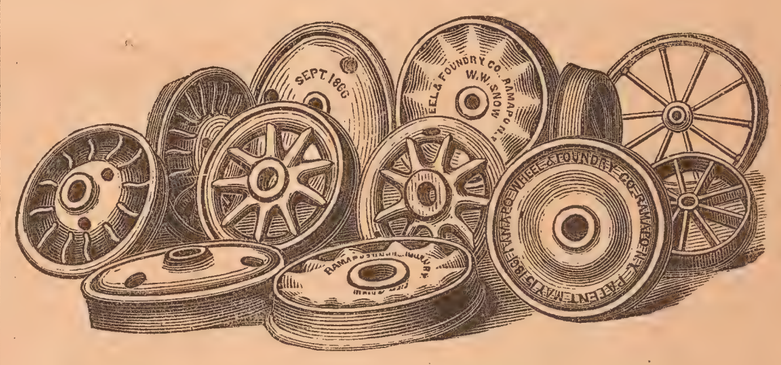

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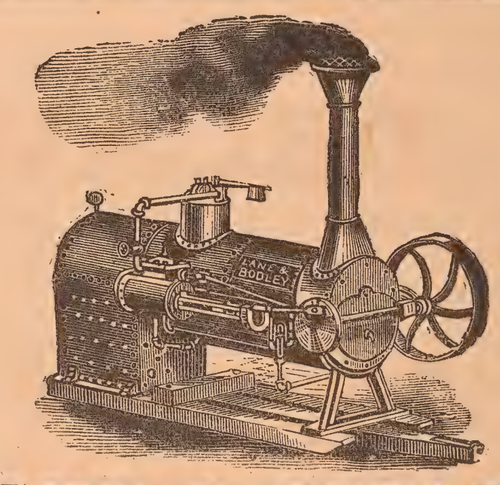

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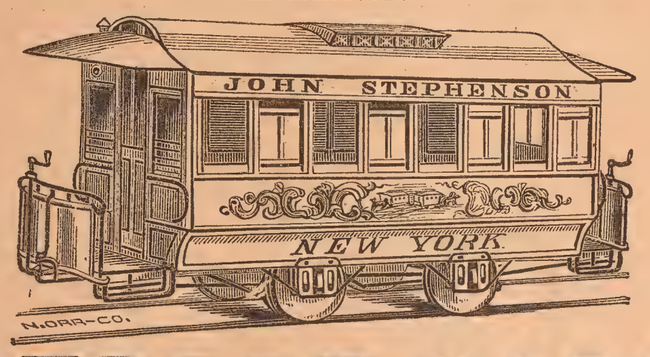

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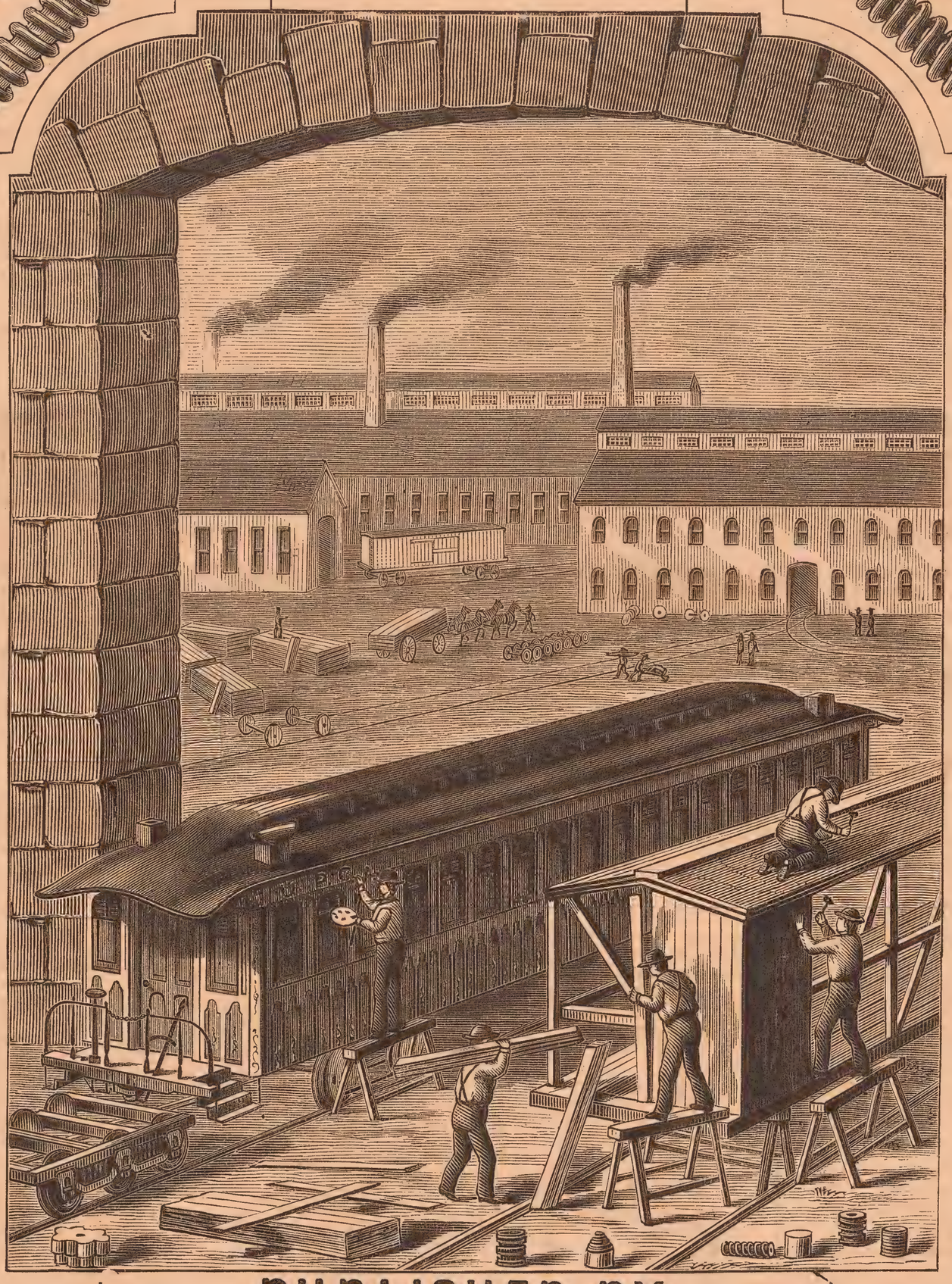
Vol. II. FEBRUARY, 1872. No 8.



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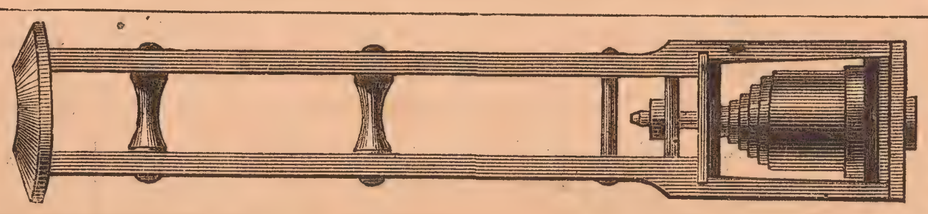

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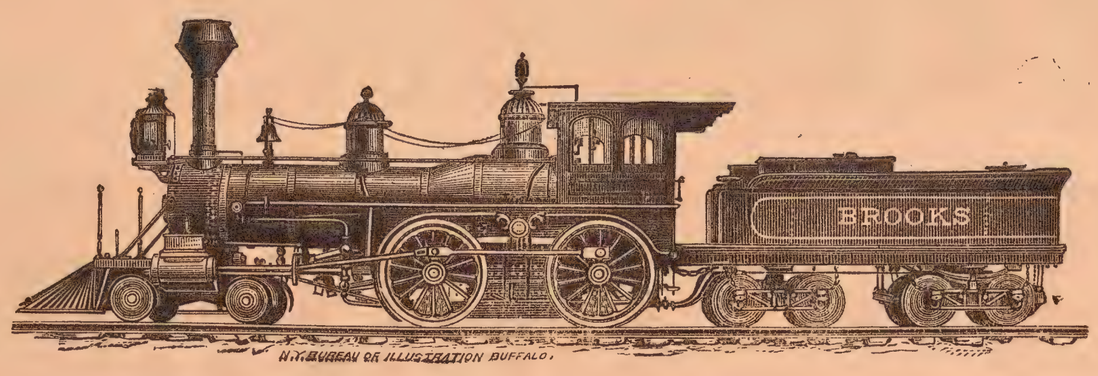

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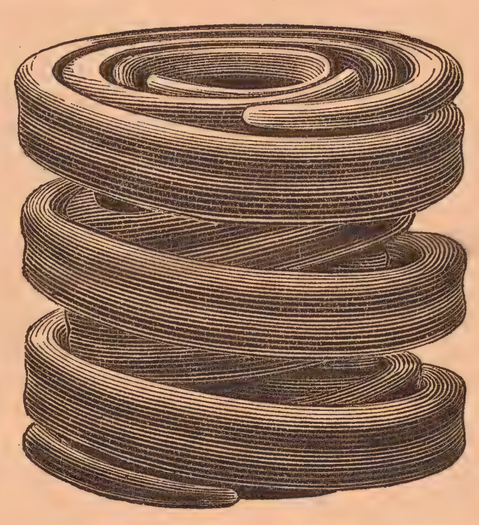

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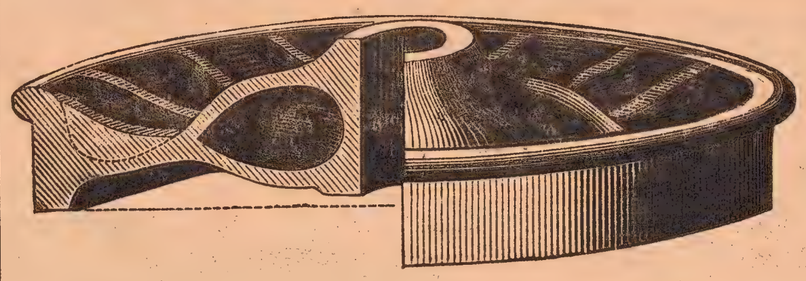

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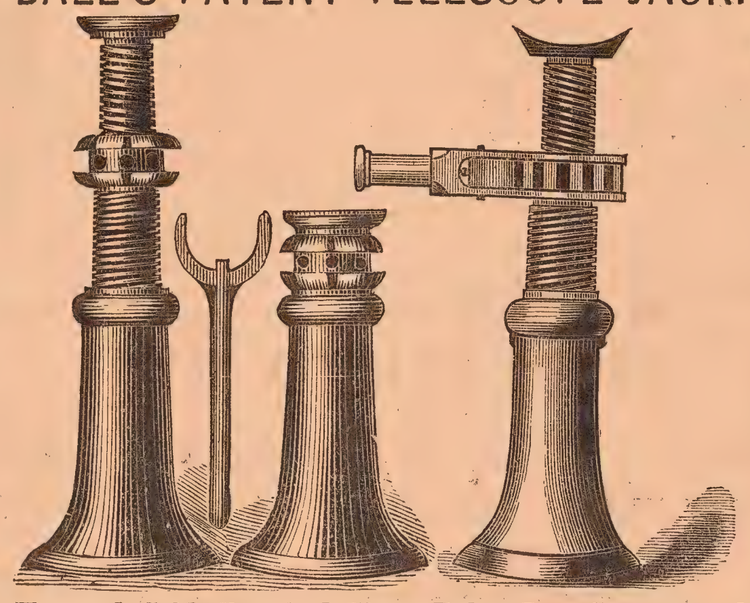

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DEVOTED TO THE INTERESTS OF RAILWAY ROLLING STOCK.

Vol. II. No. 8. | FEBRUARY, 1872. | *50 Cents per Annum. Single Copies, 10 Cents.*

Constitution of the Master Mechanics' Association.

AS AMENDED AT ITS ANNUAL MEETING, 1871.

PREAMBLE.

WE, the undersigned, railway master mechanics, believe that the interests of the companies by whom we are employed may be advanced by the organization of an association which shall enable us to exchange information upon the many important questions connected with our business. To this end we do establish the following

CONSTITUTION.

ARTICLE I.

SECTION 1. The name and style of the association shall be the American Railway Master Mechanics' Association.

ARTICLE II.

SEC. 1. The officers of the association shall be a president, a first and second vice-president, a secretary, and a treasurer.

SEC. 2. The above-named officers shall be elected separately, by ballot, at a regular meeting, and a majority of all votes cast shall be necessary to a choice.

SEC. 3. The officers shall be elected for a term of one year; but in the event of the election being postponed, shall continue in office until their successors shall be elected.

SEC. 4. Two tellers shall be appointed by the president to conduct the election and report the result.

ARTICLE III.

SEC. 1. It shall be the duty of the president to preside in the usual manner at all the meetings of the association, and approve all bills against the association for payment by the treasurer.

SEC. 2. It shall be the duty of the vice-presidents, according to rank, to perform the duties of the president in his absence from the meetings of the association.

SEC. 3. In case of the absence of both president and vice-presidents, the members present shall elect a president *pro tempore*.

SEC. 4. It shall be the duty of the secretary to keep a full and correct record of all transactions at the meetings of the association; to keep a record of the names and places of residence of all members of the association, and the name of the road they each represent; to receive and keep an account of all money paid to the association, and at the close of each meeting deliver the same to the treasurer, taking his receipt for the amount; to receive from the treasurer all paid bills, giving him a receipted statement of the same.

SEC. 5. It shall be the duty of the treasurer to receive all money from the secretary belonging to the association; to receive all bills against the association, and pay the same, after having the approval of the president; to deliver all paid bills to the secretary at the close of each meeting, taking a receipted statement of the same; to keep an accurate book account of all transactions pertaining to his office.

ARTICLE IV.

SEC. 1. The following persons may become members of the association by signing the constitution, or authorizing the president or secretary of the association to sign for them, and paying the initiation fee of one dollar. Any persons having charge of the mechanical department of a railway, known as "superintendents," or "master mechanics," or "general foremen," the names of the latter being presented by their superior officers for membership.

SEC. 2. Civil and mechanical engineers and others whose qualifications and experience might be valuable to the association may become associate members by being recommended by three active members. Their names shall then be referred to a committee, which shall report to the association on their fitness for such membership. Applicants to be elected by ballot at any regular meeting of the association, and five dissenting votes shall reject. The number of associate members shall not exceed twenty. Associate members shall be entitled to all the privileges of active members excepting that of voting. Also, one mechanical engineer or the representative of each locomotive establishment in America.

SEC. 3. Any person who has been or may be duly qualified and signs, or causes to be signed, the constitution, as member of the association, remains as such until his resignation may be voluntarily tendered.

SEC. 4. All members of the association will be liable for such dues as may be necessary to assess to defray the expenses of the association.

ARTICLE V.

SEC. 1. The regular meeting of the association shall be held annually on the second Tuesday in May.

SEC. 2. Regular meetings shall be held at such place as may be determined upon by a majority of the members present at the previous meeting.

SEC. 3. An adjourned meeting may be held at any time and place that a majority of the members present at any meeting may elect.

SEC. 4. The regular hours of sessions shall be from 9 o'clock A.M. to 2 P.M.

ARTICLE VI.

SEC. 1. This constitution may be amended at any regular meeting of the association by two thirds vote of the members present.

THE Bloomington (Ill.) *Leader* is responsible for the following account of an incident during a late gale: "An empty freight-car, standing on the track at Arrowsmith, on the La Fayette and Bloomington Railroad, was blown to Saybrook, a distance of six miles. While in the timber, just this side of Saybrook, a man jumped aboard and put on the brakes. While on the prairie, it is said to have run at a fearful rate, but the timber cut off the force of the wind to a certain extent, and when stopped, it was not moving rapidly."

Bridge over the Hudson River at Albany.

THE Albany *Evening Journal*, in noticing the completion of the new bridge across the Hudson River at that place, says,

"The bill authorizing the construction of the bridge passed the Legislature in 1869, and the first stone of the superstructure was laid June 25th, 1870. The main bridge is 1525 feet long from Quay street to Van Rensselaer Island, and the whole length, including approaches, 2250 feet. It is 30 feet in the clear above low-water mark, and eight feet above the high-water mark of 1857. There are two bridges over Van Rensselaer Creek, the first comprising three spans 62 feet 6 inches each in length, one connecting with the New-York and Boston Railroads, and the other for Troy local trains, and the latter 4 spans 60 feet each. The portion of the bridge across the basin descends three feet from the pier to Quay street. The trusses in the superstructure are 26 feet apart. All the tension-bars of the bridge are of double refined iron, and it is calculated that the bridge will stand a load of 6000 pounds per lineal foot, exclusive of the weight of the structure, the strain of which will not exceed one sixth of the breaking weight. Of the materials used the following summary is given: Piles used in pier and abutments, 110,000 lineal feet; timber, board measure, 1,100,000 feet; stone in piers and abutments, 16,000 yards; iron in superstructure, mostly wrought, 2000 tons. The draw weighs 700,000 pounds, and is to be worked by a ten horse-power engine placed beneath the roadway. Clark, Reeves & Co., of the Phœnixville Bridge Works, Phœnixville, Pa., were the contractors for the superstructure."

New Invention.

THE Girard *Cosmopolite* says that at a certain station on the Philadelphia and Erie Railroad the company has a new night telegraph operator, who, if inclined to slumber, is too ingeniously wide awake to be caught napping at his post. Recently he was seized with drowsiness, which he could not shake off. As it was his duty to report all passing, he dared not yield, and yet could not resist. That mother of invention, necessity, at length suggested an alarm-signal, which he proceeded to put in operation by suspending a scuttle full of coal, by means of a cord, which was passed through the keyhole of his office door and fastened across the track at the requisite elevation. Mr. Operator then resigned himself to rosy dreams, which were finally interrupted by a passing train, the engine of which snapped the cord, causing the coal-scuttle to come down with a rattle-te-bang that would have aroused even a sleeping Erie policeman. Another young operator, some thirty miles up the road, let a train slip by him the same night, and applied to the inventor of the coal-scuttle alarm to know when the train passed his station. No answer was vouchsafed, the inventor remarking, "Why don't the darned fool get the right to use my patent?"

Railway-Cars Forty Years Ago.

We extract from Brown's *History of the First Locomotives in America* the following interesting reminiscences of the early operations of the Baltimore and Ohio Railroad:

"The first passenger-car was like a market-car on railroad-wheels. Then came cars resembling the old-fashioned stage-coach, with the same springs and leather braces, and carrying nine passengers each, with a driver's seat perched upon either end, as there was no such contrivance as a turn-table at that early day. For a long time the cars were gaudily painted, with a small increase in the size. One of those, built by Mr. Richard Imlay, is thus described in the *Baltimore American*, August 4th, 1830:

"'A number of persons visited Monument Square yesterday for the purpose of examining a very elegant railroad passenger-carriage, just finished by Mr. Imlay, and intended to be immediately placed on the road.

"'The arrangement for the accommodation of passengers is, in some respects, different from any other which has yet been adopted. The body of the carriage will contain twelve persons, and the outside seats at either end will receive six, including the driver. On the top of the carriage is placed a double sofa, running lengthwise, which will accommodate twelve more. A wire netting rises from two sides of the top of the carriage, to a height which renders the top-seats perfectly secure. The whole is surmounted by an iron frame-work, with an awning to protect from the sun or rain. The carriage, which is named the 'Ohio,' is very handsomely finished, and will, we have no doubt, be a great favorite with the visitors to the railroad, the number of whom, we are gratified to learn, continues to be as great as it was at the opening of the road.'

"The road to Ellicott's Mills was opened on May 24th, 1830. Trains of cars like the above were called brigades, and were continued until Ross Winans, Esq., placed upon the track the first eight-wheel car ever built for passengers, and called it by the appropriate name of 'Columbus.' This car was a large box, such as any carpenter could make; it had a truck of four wheels at either end, the same as the eight-wheel cars of the present time; it also had seats on the top, like the other cars hitherto used, which were reached by a ladder at one of the corners. This was followed by several odd-shaped contrivances; one was nicknamed the 'Sea-Serpent,' another was known by the *sobriquet* of the 'Dromedary;' next came the Winchester pattern; and this was followed by the 'Washington,' each an improvement on its predecessor. The latter resembled three coach-bodies combined in one, and divided in the interior into three separate apartments, and entered by doors on each side of each apartment. The author remembers well, as if but yesterday, riding in cars of this construction, in October, 1833, upon the railroad between South-Amboy and Bordentown, which connected by steamboats both with New-York and Philadelphia. As passengers landed and approached the cars to take their seats, each car appeared surmounted with the letters A, B, C, etc., in order, and each apartment was numbered 1, 2, or 3. Thus the passenger, on examining the ticket furnished to him on the steamboat, entered the car and apartment designated thereon. These carriages continued on all the roads then operating between the principal cities—as Boston and Providence, Philadelphia and New-York, Philadelphia and Baltimore, Baltimore and Washington—until the eight-wheel passenger-car was brought into use, with the passage-way the entire length between the seats, which were placed on the sides, as at present.

"When the design for this style of car came before the board of directors of the Baltimore and Ohio Railroad Company, there was quite a discussion whether there should be an aisle in them, with entrances at each end, and seats as at present, or whether the car should be in compartments, with entrances at the sides, with a ledge outside for the conductor; and one of the arguments against the aisle, verified by the result, as we know, was the apprehension that it would often be one long spittoon! The possibility of this was admitted; but other considerations prevailed in favor of the aisle, which has continued to the present day.

"One of the great desideratums in the beginning of railroad enterprise in this country, and to which no example could be applied, was a plan to reduce the large amount of friction. In the early period of the Baltimore and Ohio Railroad, when no one dreamed of steam, horses were expected to do the work, and to reduce the friction of the axles in the boxes was the object to be achieved. In this extremity, Ross Winans, Esq., now living, a venerable citizen of Baltimore, came to the rescue with his inventive genius. Dr. William Howard, an accomplished and scientific gentleman, had already patented the application of the ordinary friction-wheel to a car, where the main journal revolved on the exterior periphery; but Mr. Winans suspended his wheel by a projecting flange, on the interior periphery of which the main axle revolved. This was the *ne plus ultra* of the friction-wheel, and Mr. Winans became immortalized. B. H. Latrobe, Esq., describes a scene in one of the upper rooms of the Baltimore Exchange, where the venerable Charles Carroll of Carrollton, who was the great man on all important occasions, was seated in a little railroad-car, drawn by a small weight attached to a string passing over a pulley and dropping into a hall below. Around him were all the prominent men of Baltimore; all were as much pleased as children with a new toy. In fact, there was a verdant freshness about all railroad objects in those days which it is wonderful to conceive in this period of advance and improvement.

"Not only was friction sought to be avoided, but all sorts of experiments were tried to improve the road. To ride in a railroad-car, in those days, was literally to go 'thundering' along. The roll of the wheel was hammering the iron rails out of existence. When this became known, after tens of thousands of dollars had been thrown away, one of the directors, a man, too, of general information, proposed to lay a thin slab of lead between the iron and the stone, to relieve the concussion. Luckily, this costly experiment, which would have furnished the sportsmen of the interior with slugs and bullets without cost, was not carried into effect. We only mention this now, to show how crude were the notions of the wisest men touching railroads, in their infancy in this country, and to indicate the obstacles our forefathers had to contend with in the early days of their construction. With no example before them to follow, with no experience before them to govern, every thing had to be tested by actual experiment."

Traveling in palace-cars receives a judicious word of favor from the Buffalo *Commercial, à propos* to the preservation of life, in comfort, during the recent fearful storms along lines in the west and north-west, where, in one instance, the passengers had to wait in the car seventy-two hours.

"In old times, this would have been a very dangerous situation, and so it would have been as it was, had not the passengers fortunately been shut up in one of the luxurious palace-cars. The elegant car, in addition to its comfortable appointments for sleeping, was abundantly provided with provisions, and very luckily there was an abundance of ties along the track. Under this state of things, they passed the time very comfortably.

"The elegant furnished cars on the great through lines are a great improvement upon the cold, cheerless affairs that once used to be met with everywhere. It is all very easy to growl at the extravagance in American railway management, but we will venture the assertion that every one of the passengers who were snowed up regarded the car they were in as a first-class investment."

Flint and Pere Marquette Railway Machine-Shops and Car-Works.

The East-Saginaw *Enterprise* says that the works of this company at that place consist mainly of a car manufactory, machine and repair-shops, blacksmith-shops, etc., giving employment to about three hundred men, and turning out cars and other work to the value of $20,000 or more per week, (including cost of materials.)

The main building, used for the construction and repairs of cars is of brick, 80 by 200 feet, two stories, and is situated a few rods north of the track, and east of the turn-table and round-house. In this building is a steam-engine, 15-inch cylinder and 30-inch stroke, the steam supplied by two boilers, each 6 feet in diameter and 14 feet in length. This shop is furnished with planing and saw-mills for dressing the lumber and timbers used in the manufacture of cars. The lighter work, such as car-doors and seats, is done in the second story; here also the upholstery is done, and the manufacture of patterns for the various castings required. The best of workmen are employed, and the excellence, good finish, and artistic taste now to be seen in the cars being constructed are worthy of notice. The company manufactures all its flat and box-cars, and four of the former or three of the latter can be turned out in one day. The flat-cars are now much in demand for the transportation of lumber and saw-logs. Those 28 feet in length, weigh about 14,000 pounds, and 32 feet in length 16,000 pounds, and cost about $700 each. The box-cars cost about $850.

The manufacture of passenger-cars has but lately been commenced. They have now a first-class passenger-car undergoing repairs, and a new and elegant superintendent's car in process of construction.

The wheels used on cars built here are of the best quality, from the manufactory of the Ramapo (New-York) Wheel and Foundry Company. The trucks are an improved, extra strong build. The machine-shop is a brick building, not so large as the car-shop, and contains iron lathes and other machinery for turning off and fitting the axles to the wheels, and all iron machine work required. The blacksmith-shop is a temporary wooden building, between the machine and car-shops, and sixteen sons of Vulcan, at sixteen forges, are striking while the iron is hot, and make lively work of it. A new brick building, 60 by 255 feet, is now going up for the permanent use of the blacksmith and machine-shops. There will be room in this for 22 forges, with ample working and storage-room for iron, etc. The round-house, a prominent building near the track, is a brick structure of semi-circular form, with a radius of 120 feet, of which the turn-table is about the centre, with track radiating to the different sub-divisions of the building, where the locomotives are run in for shelter, cleaning, and temporary repairs. At present, twelve locomotives, coming in with the various trains, are regularly taking their night's rest under this roof. There are four large tanks, holding 2000 gallons each, and supplied by a steam-pump for the convenient feeding of the trunks of the tenders starting out.

The ground of the area occupied by these buildings is underlaid in every direction with iron pipes for drawing water from the river, for draining off surplus water condensed from steam, and for the passage of steam and hot-air. The machinery of all these buildings is run by the power of the engine in the car-shop, or by steam from the same boilers.

There are a number of smaller buildings, among which are a drying-house, where green lumber is prepared in a few days by the steaming and hot-air process; and a storehouse for hardware, such as nails, bolts, and other fixtures required in the manufacture of cars; and for oil, and various other articles.

The manufacture and repairing of cars, and the whole system of mechanical operations, is under the direction of Sandford Keeler, as master mechanic. He is one of our East-Saginaw boys, who, commencing in Warner Eastman's foundry and machine-shop, and going into the employ of the Railroad Company when

there were only facilities for slight repairs to locomotives, some of the time running one himself, has kept up with and proved himself competent to be at the head of the extensive works and machinery we have so briefly described.

These works, employing so many men, in winter as well as in summer, mostly having families and expending their wages here, contribute largely to the growth and prosperity of the city. Fifteen to eighteen thousand dollars a month paid out to workmen, and by them mostly to merchants, dealers, and other mechanics, goes a great ways in keeping things moving and preventing stagnation in dull times. East-Saginaw owes much of its growth and prosperity to the building up and carrying on of these extensive works.

An extension of the building now going up for a blacksmith and machine-shop is designed to be added another season, when the company will be prepared to manufacture their own locomotives.

We add to the above that the road passes through an extensive lumber region, and is well equipped for the transportation of this and other kinds of freight. Its business is increasing in a steady and sure ratio, which indicates capable and prudent management. The stock is mostly owned in New-Bedford, Massachusetts, and is held by large capitalists.

English and American Railways.

THE Rev. Thomas K. Beecher, in one of his letters from England, says,

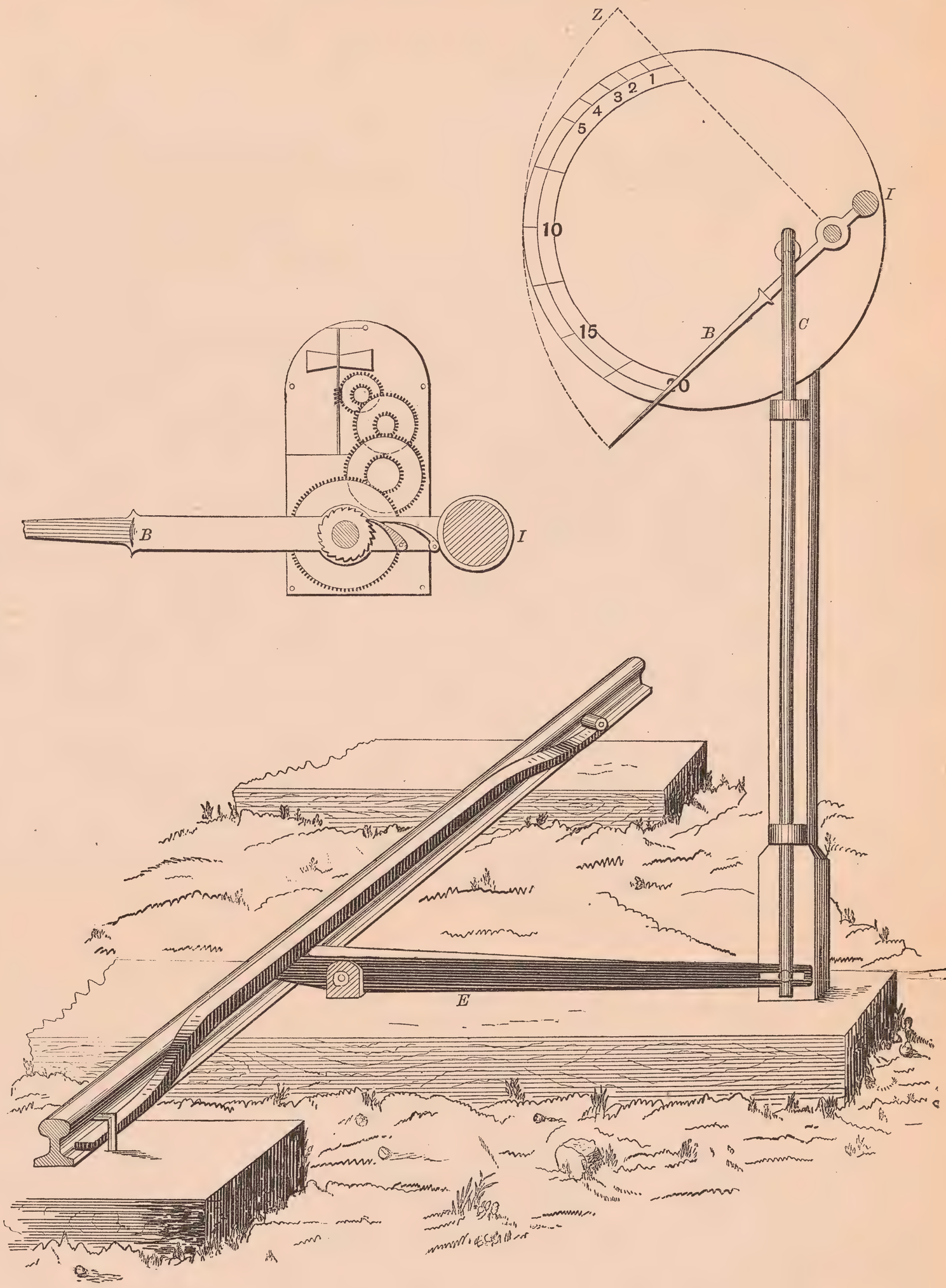
"The railways here are not better than our own. Either the English roads have deteriorated, or else our own have appreciated. I assume that the fastest train on the direct line between Liverpool and London may be taken as a fair sample, and compared with similar trains on the Erie Railway at home—with which I am most familiar. From Liverpool to London—two hundred and ten miles—through first-class fare is thirty-five shillings—say nine dollars. On the Erie, from New-York to Elmira, in a drawing-room coach, is eight dollars—a 'local' rate. We ride in by far the more elegant coaches at home, and at perceptibly cheaper rates than here. We ride as fast, too, on the Erie as here—about thirty-five miles, in either case.

"In smoothness, there is no comparison. Motion on the Erie is like rolling on oil; but here we rattle in our seats like tin-pails in a wheelbarrow. Here, one wheel falling, necessitates disaster; there, we can spin off from one to six, and, if judiciously selected, the coach is still mobile and not a wreck. Here, it is difficult to talk, and impossible to write; there, I do both quite intelligibly.

"I am proudly surprised, after an absence of eighteen years, to find an English railway no longer superior to our own in any particular that affects a traveler—no, not even in the matter of dust and ashes."

Air-Power for Street Locomotion.

MR. HURD, of Wakefield, with Mr. Froth, of Leeds, has made a preliminary application for letters-patent for applying compressed air as a motive power for drawing omnibuses and other vehicles, and entirely doing away with horse-power. Should the proposed plan be adopted, it would completely revolutionize our present mode of street traveling, and it is expected to effect a great saving. For carrying out his scheme, Mr. Hurd proposes to erect in some central place in any town a colossal air-compressing engine, with suitable buildings, the same as gas-works, with receivers, pipes, etc. The mains would be laid in the street on the surface, and in such a way as to form the road, gutter, or even pavement. The air would be sent from the receivers into the pipes, which could be tapped and taken away at such points as might be deemed convenient. Mr. Hurd is engaged, we understand, in preparing a series of models, showing the means by which he proposes to carry out his plan.—*Herapath.*



Automatic Time-Signal.

THE object of this device is to indicate with accuracy to every passing train the time which has elapsed since the last preceding one passed, and thus obviate as far as possible the danger of trains running into each other. The engraving shows very clearly the manner in which the apparatus is applied to the track, and the mode of its operation. A bar of iron or steel, fastened by a joint at one end and working loosely in a guide at the other, is placed on the outside of the outer rail and parallel with it. This bar is of sufficient length for two or more wheels to rest upon it at the same time, and as a train passes, it is pressed down and made to act at its centre upon the short end of the lever E. The long end of the lever raises the upright connecting-rod C, which hangs upon the index-finger B; and the latter, thus relieved of its weight, rises by the gravitation of the counter-balance I to the point Z, or zero, on the dial-face. The weight of the connecting-rod runs the clock-gearing, (represented separately in the cut,) and which is attached to the reverse side of the dial-face. A passing train throws the index-finger to zero, or its starting-place, from which, by means of the clock-work, it runs down in regular time until the next train throws it back again to zero, the position of the index-finger informing the engineer of every train, in the night as well as in the day-time, exactly the interval which has elapsed since the preceding train passed.

It is claimed by the inventor that this signal, when once introduced and placed at suitable points along railway tracks, will effectually prevent trains from running into each other in consequence of irregularities in time; and that it is equally and especially serviceable in the running of extras, special and flag trains. Telegraph wires can also be attached to them, and information given in the usual way of the movement of trains. By having two dial-faces, they can also be adapted to a single track as well as double.

Any further information in regard to the automatic time-signal may be obtained by addressing the inventor, Mr. L. W. Coe, 97 Liberty street, New-York City.

MR. S. B. STIMSON has been appointed Superintendent of the West-Wisconsin Railroad, in place of J. B. G. Roberts. Mr. Stimson is an old railroad man, having been superintendent of various roads for fifteen years. Mr. Roberts is to remain on the road. He will occupy the position of resident engineer.

Recent Patents.

We copy the following notices of recent patents from the *Scientific American :*

Car and Tender Loading Apparatus.—Mr. James Williams, of Bell's Depot, Tenn., has just patented an invention which consists in a box holding a sufficient quantity to load the tender with fuel or the car with freight. The box is pivoted on a frame higher than the tender and car, so as to tilt toward the tender and car, and the side of the box which swings down is hinged so as to be let fall upon the top of the tender or car and form a chute for conducting the contents into the vehicle to be loaded. The ends of the hinged side have pieces similar to the end-boards of the box, which assume a vertical position when the side falls down, and form sides to the chute, preventing the escape of the contents of the box over the ends. For loading tenders, the box is much smaller than is required for discharging a car-load at once into a car, and is arranged in vertical ways. A hoisting-drum and other necessary apparatus for lifting the box from the ground to the proper elevation for discharging is employed; but for loading cars the freight should be as high as the box to be put into it, or it may be carried up by elevators. The frame supporting this loading apparatus is mounted on car-wheels to be run along a temporary track, to facilitate the taking of the wood or coal from different positions, and conveying the load to the proper place for discharging.

Head-Rest for Car-Seat.—John C. Giffing, of New-York City.—The head-rest is attached to a base-block, which rests upon the top of the seat when the head-rest is attached. The head-rest is secured in this position by two metallic straps. The ends of the base-block are sawed in a distance equal, or about equal, to the width of the straps. The straps are bent to form square-cornered staples. The front leg of the staple-shaped strap extends down on the front side of the back of the seat. The back leg extends down on the back side of the seat, and may be shorter than the other leg. The width of the block is designed to be about equal to the thickness of the back of the seat, so that the legs of the two straps will straddle the back of the seat. In fastening the head-rest to the back of the seat, the parts of the strap are slipped into the slots in the ends of the block, where they are fastened by pins. In leaning back or resting against the back of the seat, the person's back will bear against the front legs of the straps, which will keep the head-rest in its proper position when the head bears upon the cushion. When not in use, the head-rest is folded up, in which condition it may be carried in a satchel or overcoat pocket without inconvenience.

Car-Coupling.—Frederick A. Illingworth, of Waltham, Mass.—This is an improved arrangement of coupling-hook and shackle on a car-coupling, and has for its object to bring all the parts of a coupling under more perfect control, and, at the same time, insure greater reliability than can be found on the cars now in use. The invention consists first in providing the pivoted coupling-hook with a prop or device whereby it can be held up clear of the link or shackle or let down at will. The invention also consists in the new arrangement of a pivoted connecting shackle, which has also a prop, whereby it can be held in a horizontal position ready for coupling. Furthermore, the invention consists in a general new arrangement of parts for the purpose specified, and by which ordinary coupling links can also be used for connecting cars having common drawheads with those provided with this improved coupling.

Car-Couplings. — Franklin Nalley, of Battle Ground, Ind.—This invention has for its object to furnish an improved car-coupling, so constructed as to couple the cars automatically when they are run together. By this construction, as the coupling-link enters the bumper-head, it pushes a catch back, which releases the coupling-pin and allows it to drop into place, securing the link. By inserting the double coupling-link in the upper and middle holes, in the middle and lower holes, or in the lower hole and beneath the bottom of the bumper-heads, cars of different hights may be coupled with the same facility as if they were all of the same height.

Iron Freight-Cars.

The merchants of St. Louis are just now interested in a model of an iron freight-car now on exhibition at the Produce Exchange in that city. This car, which is said to meet with much favor, is cylindrical in shape, giving, it is claimed, greater strength without the least decrease in carrying capacity—the pressure against the sides, whic in the square cars can only be obviated by great care in loading, tending in the case of the cylindrical iron car only to equalize the distribution of weight upon the floor. The form also admits of perfect ventilation, as the false floor necessary gives an air-chamber beneath, while the formation of the sides by double casing extends this air-chamber on all sides throughout the length of the car. In the model, a simple arrangement is shown by slides and perforations of the false or interior bottom and sides, whereby a constant current of air could be maintained through grain or other freight while the car is in motion. The most important feature, however, is the use of iron in construction in place of wood. This not only secures absolute immunity from fire, a feature which will tend to greatly lessen the cost of carrying cotton and other inflammable freights, but, while increasing the strength of the car some fifteen per cent, and rendering damage to such freight as flour impossible from broken timbers, etc., reduces the weight of the car one ton; in other words, enabling an engine capable of hauling twenty loaded wooden cars of the present form, to haul twenty-two with the same expenditure of power, and wear and tear to road-bed and superstructure. This would result in a saving of at least ten per cent upon freight traffic, a consideration too important to be overlooked by practical railroad men. The interest manifested in this model by the merchants of St. Louis is an indication of the gradual growth of a popular sentiment in favor of the substitution of iron for wood, as a material for cars. The change is one which is sure to come sooner or later, and while we do not look for a rapid movement in this direction, owing to the difficulty and expense of changing the car manufactories of our principal railroads into works for the manufacture of iron cars, the necessity for economy in traction by a reduction in the proportion of dead weight now hauled will eventually compel the use of iron cars for both passengers and freight.—*Railway Times.*

Sleeping-Cars in England.

The following paragraph, which we copy from *Engineering*, seems to indicate that our cousins on the other side are making progress in the matter of railway equipment—not by any means a wild, headlong, inconsiderate, reckless sort of progress; but that slow and cautious kind characteristic of a community naturally hostile to any change in established customs. Any thing in the shape of a traveling hotel, with eating and sleeping accommodations in full blast, all moving at a speed of forty miles an hour through an English fog on a moonless night, is regarded by John Bull as a freak of the imagination—an innovation of a dangerous character that should be subjected to proper restraint, by being discussed, weighed, measured, and tested on a limited scale before being generally adopted. So it is proposed to begin with a sleeping-car thirty-three feet long, which is two feet longer than the common carriage. If this works, we may expect in time to see a car or carriage forty feet long adopted; and ultimately—perhaps before the close of the present century—we shall see the English railway carriages giving place to our own style of car, so commodious, and so long and thoroughly tested. The extract to which we have alluded is as follows:

"There has lately been exhibited at the Caledonian Railway Station a new form of sleeping-carriage, which has been invented by Mr. James Howlinson It is remarkably well adapted for night traveling. Externally, the carriage is exactly the same as those in ordinary use; its length is 33 feet, or about 2 feet longer than the common carriage. Internally, the compartments while in use during the day do not differ in any respect from others; but when night comes on, the arm-rests in the first-class compartments are raised, and thus two beds are provided; while above, what seems the partition of the carriage is lowered on each side, and other two passengers are accommodated for the night. These upper berths, which are provided with pillows, resemble somewhat the 'bunks' in use at sea. They are supported on brass rests fitted into the sides of the compartment, and are further secured by chain-straps depending from the roof, by way of giving a feeling of additional security to sleepers. The carriage in question has been in use during the past month between London and Cambridge, and is now in Glasgow for the inspection of local gentlemen."

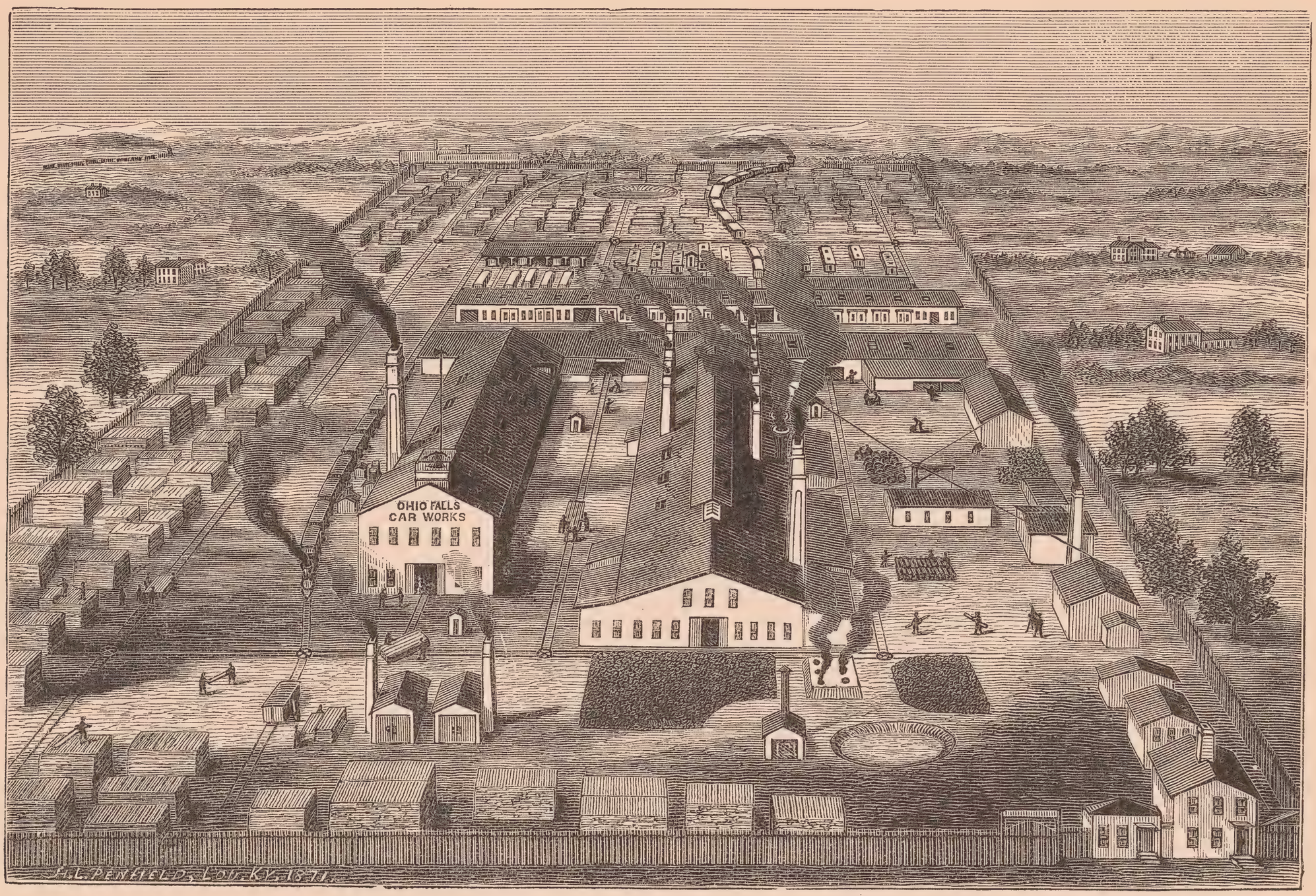
Testing-Machines.

The testing of metals to ascertain their quality before converting into manufactured articles is occupying the attention of the community interested in such matters to an extended degree. A new machine of ingenious but simple device is now being made by a well-known firm in Philadelphia, engaged in the manufacturing of scales; it is, in fact, a compact, powerful weighing-machine, so adjusted as to ascertain with the utmost accuracy the strain required to break the test-piece of iron, boiler-plate, etc. The machine is as nicely balanced as any ordinary scale, having steel fulcrums at every friction point. The balance is so delicate that an ounce-weight placed on the weight-holder throws it out of equipoise instantly. It has already attracted the attention of the largest operators in the city, and orders have been sent from a distance. One of 82,000 pounds capacity was shipped to Cincinnati lately, upon which a number of the most satisfactory experiments were made for the Baldwin Locomotive-Works, with boiler-plate particularly. A tool for holding the plate, so that it is subjected to a fair and square strain, is of novel device, and accompanies the machine. The Messrs. Riehle Brothers, the firm referred to, have turned their attention to this branch of their business, and are making preparations to engage largely in it. They have already a number of drawings and patterns for machines to be applied to various purposes, such as testing columns and girders, bridge-bolts, chains, wire rope, wrought and cast-iron, and boiler-plate. The remarkable nicety with which tests can be made with this machine will make experiments in testing material very interesting and useful.—*Iron Age.*

The Detroit Tunnel.

The present condition of the work of excavating a tunnel under the bed of the Straits separating Detroit, Michigan, from Windsor, Canada, is thus described A large coffer-dam, forty feet square, has been constructed by driving down in double rows thick piles, upon which six-inch planks were bolted. A solid pier was then formed by ramming in hard blue clay, and through this newly-made land the shaft is to be sunk. The base of the iron shaft, fifteen feet in diameter, two feet thick, and weighing eight tons, has been placed in position, and upon it brick-work laid in asphalt has been built to the height of ten feet. The weight of the iron base and the brick-work will gradually sink the shaft to the required depth of fifty feet, as the earth is taken from beneath. When the bottom is reached the next work will be the excavation of the drainage tunnel, five feet in diameter and twenty-five feet below the main tunnels at the respective entrances, but rising gradually to the central point.

Feb 1872



The Ohio Falls Car-Works.

THE works of the Ohio Falls Car Company, a general view of which is given in the engraving, are located at Jeffersonville, Indiana, on the Ohio River, and immediately opposite the city of Louisville. The company was organized in 1864, with a paid-up capital of $300,000, which has since been increased to $500,000. During this comparatively brief period, its business has steadily increased until it has become one of the most extensive establishments of the kind in the West. Through the energy and enterprise of its managers, its capacities have been developed to an extent corresponding with the rapid strides of railway progress in every part of the country. Its ability to turn out work was limited at the outset to five freight-cars per day, while its present capacity is equal to twice that number of freight-cars per day, and two passenger-cars per week. Its location is a favorable one as regards convenient access to the sources of supplies and material, such as iron, coal, and lumber; while the facilities for transportation by river and rail could hardly be surpassed.

The bird's-eye view of the works and their surroundings given in the engraving conveys a clear idea of their magnitude and systematic arrangement. The grounds comprise twenty-six acres, inclosed by a high fence. Just inside of this fence, and running round the entire area, is a road or passage-way twenty feet in width, affording convenient access to every part of the premises. There are eleven distinct lumber-yards, separated from each other by broad avenues. A large stock of lumber, embracing every variety used in car construction, is kept in readiness at all times, the present stock amounting to some six millions of feet, to which additions are constantly being made. Walnut, ash, maple, and oak are procured within a distance of one hundred miles of the works; white-pine is obtained from Michigan and Chicago; and large quantities of the long-leaved yellow-pine from Southern Mississippi are used for the sills of both passenger and freight-cars.

The premises are provided with several miles of railway tracks for the convenience of local transport, the tracks intersecting each other at right angles and connected by twenty-two turn-tables. The motive power is furnished by two steam engines, one of which is remarkable for the beauty of its design and the finished completeness of all its details. The system of transmitting power by small wire ropes has recently been introduced by the company, and the machinery in three of the shops is now driven by this means. Every precaution is provided against fire. In addition to the ready access to every part of the premises by the means already alluded to, there are one portable and two steam fire-engines in constant readiness, and connected with hydrants by service-pipes under ground. The supply of water is procured from three different sources—a very large cistern under the shops, a pond in the front yard sixty feet in diameter, and another in the rear yard a hundred feet in diameter. A treasurer's office has been recently erected, as nearly fire-proof as possible, and with a large vault attached.

The passenger-car department is under the superintendence of Mr. John Gunckle, well known as one of the best builders of this class of railway rolling-stock in the West, and is now turning out some passenger-coaches which are not surpassed by any in the country in substantial workmanship and general elegance of design and finish. The sales of the company during the past year have not been limited to a section of the country to which their works are more immediately accessible, but they have been large at more distant points, embracing New-York, Georgia, Louisiana, Texas, and California. The deliveries of cars for the six months ending December 31st, amounted to $835,499 90; and in this connection it may not be amiss to state that, in the building of these cars, as many as 6000 rubber centre spiral springs of Vose, Dinsmore & Co's manufacture, have been used per month.

The officers of the Ohio Falls Car Company are Joseph W. Sprague, President and Superintendent, and William Crichton, Jr., Secretary.

THE Springfield and Illinois South-eastern Car Company, with a capital stock of $200,000, filed articles of incorporation in Springfield, Ill., January 10th.

Housatonic River Bridge.

THE new iron bridge over the Housatonic River, at Stratford, Ct., on the New-York and New-Haven Railroad, is completed. In undergoing the final tests of its strength and efficiency, every running foot was subjected to a test of two and a half tons, and stood the ordeal in a most satisfactory manner. This bridge is one of the handsomest in the State, and is a part of the grand system of improvement inaugurated some years ago by the present management of the road. The Naugatuck Railroad joins the New-York and New-Haven track on the eastern shore of the river; and, in addition to the immense business of the latter road, all the Naugatuck trains must also pass over this bridge. It was commenced in March, 1871, and has been pushed, in spite of the cold weather of the early winter, to completion in a wonderfully brief time. The bridge is 1091 feet long, 27 feet wide, with two tracks; and the height of the iron-work is 24 feet. It has five spans, three on the east side of the draw and two on the west; and the draw is 206 feet long. Five pier sand two abutments of solid masonry support the iron-work of the spans; and the height of the piers, except the draw-pier, is 36 feet 8 inches, they being 7 feet wide at the top and at the bottom. The draw-pier is 30 feet wide at the top and 35 feet at the bottom, and rests upon 427 piles, sawed off by divers level with the bottom.

MR. J. H. SETCHEL, Secretary of the Master Mechanics' Association, announces that nine hundred and forty-one copies of the official report of the last annual meeting have been sent to the members of the Association and other master mechanics throughout the country. Three copies have been sent to each member, and one copy to those not belonging to the organization. It is desired that all shall have the report who are interested in the mechanical departments of railroads. Those who have not received a copy will confer a favor by sending their address to the secretary at Cincinnati.

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BY

VOSE, DINSMORE & CO.,

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Editorial Announcements.

Correspondence.—*We cordially invite the coöperation of the railroad public in affording us the material for a good mechanical paper. Articles relating to rolling stock and machinery, by those practically acquainted with those subjects, will be gratefully received. All communications must be addressed to Vose, Dinsmore & Co., No.* 1 *Barclay Street.*

The name and address of the writer must accompany all communications designed for publication.

Advertising Rates.—*For one square, or one fifth of a column,* $5 *per month, or* $50 *a year. For half a square,* $3 *per month, or* $25 *a year. Larger advertisements by special contract.*

All communications in regard to advertising should be addressed to L. F. Dinsmore, *Post-Office Box* 4055, *New-York City, who is our agent for advertising, and authorized to make contracts, collections, etc.*

Engravings and Illustrations.

We would invite the attention of Master Car-Builders and others to the advantages to be derived from publishing in The National Car-Builder *engravings designed to illustrate the various features and details of car construction, and especially such improvements as can not otherwise be clearly presented. We will procure cuts to be made in the best manner from drawings or models that may be sent us, and charge only for the cost of engraving, inserting the same in our paper with suitable descriptive details, without charge. The cuts thus made by us, or that may be sent us for use in* The National Car-Builder, *will of course be returned promptly to the owner.*

Iron Cars.

The construction of iron cars is a problem which has been fondly dwelt upon and pondered by a class of mechanics who are usually the last to study with care the difficulties with which such a use of iron is attended. At the present day, it would of course be very great folly to assert that iron can not be adapted to the construction of cars as well as bridges, and a thousand other uses in which it is employed. What we want now to call attention to, is the common fallacy which people rest their faith upon, and which is entirely inadequate to support any general conclusions. They say that iron is better adapted for the construc- of some things which formerly were made of d, and therefore iron cars would be better than wooden ones. Now, while it is true that an iron bridge is better than a wooden one, it is equally true that for a flag-staff, for example, there is nothing so good as a tall, straight, clear-grained piece of wood. So of an ax-handle, and a thousand other things for which wood is better adapted than metal. Some years ago, we remember a crack fire company in a neighboring city ordered a steam fire-engine which was intended to be "surpassed by none, and equaled by few." Some genius with more assurance than experience devised for the engine a set of wheels constructed almost entirely of metal. The spokes were hollow tubes placed at exactly the right angle to give the maximum strength. The felloe had a bearing of India-rubber between it and the tire to give the requisite elasticity to the wheel when subjected to the rough usage of the "boys" who handled the "machine." The whole was supposed to be designed with the most consummate ingenuity and scientific skill; but like many another fond scheme, when put to the test it broke down. Like some bridges, they broke down, notwithstanding the fact that the clearest mathematical calculations showed they ought not to have done so. The result of the experiment was, that the ingeniously designed metal wheels were thrown away and a set of good stout wooden ones substituted, which, for aught we know, are running to this day.

Now, we should regret if what we are saying should be interpreted as an attempt to undervalue or oppose the use of iron for cars. What we do say is, that there are difficulties in the way of the use of this material to which those who clamor so much for the construction of iron cars would do well to give heed.

Any one acquainted with current newspaper literature can recall articles descriptive of new iron cars designed by Mr. Skrudryfer, or Munckeerentch, or some other man, and which it is usually predicted will soon revolutionize the whole construction of cars. After the local notice they receive, they are apt to pass out of existence unobserved, and the company who tried the experiment, when they again order cars, always fall back into their old ways and order them made of wood. The latter material has, in fact, some properties which are better adapted for the construction of all kinds of vehicles than the corresponding properties which iron possesses. Elasticity or compressibility is one, and the absence of resonance is another. The noise of an iron passenger-car would be almost intolerable; and if the car was finished inside with iron, it would have that hard, disagreeable effect produced by iron furniture. These objections would, of course, not apply, or at least not to the same extent, to freight-cars. We have seen some tender-frames which were well designed, and which one locomotive manufacturing company, we believe, are now using for all their tenders. They use channel iron for the longitudinal parts of the frame, and brace it laterally with flat-bars. The same company have been experimenting with the same system for platform-cars, but with what success we have not heard.

The advocates of iron cars urge, and with much zeal too, that they would be safer than wooden ones. It is, however, by no means certain that such would be the case. A wooden beam of a given weight will resist a sudden shock much better than an iron bar of the same weight. The pilots or cow-catchers of locomotives are nearly always made of wood instead of iron, and the testimony of the majority who have used both is, that wood will resist more in case of collision than iron.

At present, it seems quite doubtful whether iron cars will be substituted for wooden ones, at least so long as good timber is plentiful and cheap.

The Baltimore and Ohio Railroad Company has experimented with iron-freight cars, and, while finding them an improvement over the wooden car, has also discovered that in numerous instances certain kinds of freight were rendered useless by the sweating process to which iron cars are subjected. To obviate the sweating process, a system of ventilation was resorted to; when it was found that, if the goods were not covered with dust, they were in great danger of being set on fire by sparks which found their way into the cars through the channel left open for ventilation. The company, however, is experimenting with iron cars, and will use every exertion to bring them into general use.

Out of three hundred and seven million passengers carried last year on the English railways, only seventeen were killed by "cause beyond their own control." This is less than half the number killed during the same period by orange-peel thrown on the London pavements, which would seem to prove it is just twice as safe to ride on English railroads as it is to walk on the London streets.

The Light Cars on the Erie Railroad.

BY W. E. PARTRIDGE.

During the past three years, the Erie Railroad has been running a number of light passenger-coaches over its line. On account of their light weight, great capacity, roominess, and the easy manner in which they treat the track, they have been objects of great interest to car-builders, and especially to those who are looking closely into the matter of dead-weight, just now so much agitated by the advocates of narrow gauges. Another point of interest attaches to them from the fact that the Erie road is full six-feet gauge, and any attempt to bring the weight below even the average of passenger-cars, must be done in spite of the circumstance that each axle is at least a hundred pounds heavier than those on the standard gauge of 4 feet 8½ inches.

These cars were designed and built by Mr. C. A. Smith, Superintendent of the Erie car-shops at Jersey City. In designing them, there were many points to kept in view. The chief of these were, first, the strength of the axle relative to the whole load carried must be in no way diminished, but if possible increased; second, due consideration must be given to the comfort of passengers; and third, every pound of superfluous weight must be dispensed with. The first consideration, of course, precludes the possibility of making the sills of the cars or wood-work of the trucks any lighter. It entails, however, the necessity of a careful selection of every stick of timber for either car or truck, so that they shall not be unnecessarily heavy. By using Ulster iron, the bolts, braces, rods, etc., are rendered stronger, while the weight is thereby much diminished. While retaining ample room for passengers, it was found possible to reduce the width of the car-body to ten feet six inches, or only about a foot wider than those used on some of the standard gauge roads. This, of course, aided to a considerable extent in reducing the weight. But the chief dependence was placed upon making the posts as small as possible, and from selected timber; the use of stronger iron, and less of it; thin panels well secured, and a careful reduction in the size and weight of every part not essential to strength. The length of these cars is 50 feet, and their width 10 feet 6 inches. They seat 64 passengers, and weigh 33,500 pounds, or a trifle over 523 pounds per seat. The seats are twenty-three inches wide. If the space was reduced as on some roads, there would be room for 67 persons, and the weight would be about 495 pounds per seat. In this connection we would mention that there are passenger-cars nearly ready to leave the shops, 54 feet 6 inches long, by 10 feet 6 inches wide, with the usual height in the centre, seating without stoves 72 passengers and weighing 34,650 pounds, or 481 pounds to a passenger, which is even lighter than those above mentioned.

In examining into the method by which this plan has been carried out, the frame of the car demands the first attention. Six sills of Southern pine are used, 4 inches by 8. The truss planks are 1¾ inches thick by 16½ inches deep. In these parts there can be no reduction of weight, and there is even a slight increase by strengthening the ends of the central sills with an oak plank 10 feet long, and by the use of the Miller platform. The posts of the car are of the best selected ash, 1¼ by 2½ inches, just about half the size formerly used, and of course much lighter. The top plate, 1¾ by 4¾ inches, is of Southern pine. The roof is of the ordinary raised pattern, covered with tin, and is supported by six composite ribs, each consisting of an iron plate centre, 2½ by ⅜ thick, stiffened by wood bolted on each side. At the ends it is spread out into a broad foot that takes a bearing on the upper plate immediately over the posts. The foot is made wide, so as to receive two ¼-inch rods of Ulster iron on each side of the post, firmly securing rib, plate, and posts to the sill of the car. The bolsters are each made of three pieces of timber, with two pieces of iron, 3 by ½ inches, bolted in between them. Here is a small addi-

tional weight; but the strength and stiffness are more than an equivalent for it. The truss-rods are of inch iron, those formerly used being an inch and a quarter. Outside panels are ⅝ inch thick.

Under these cars the usual style of four-wheeled truck is used. The axles weigh at least 400 pounds, which is from 80 to 100 pounds more than those on standard gauge roads. The bearings are 3¾ by 6 inches. The maximum load allowed is 3 tons per axle, or 5¼ gross. The wheels are 33 inch. The average weight of the cars is 33,500 pounds. There is less than 100 pounds variation in all that have been built by Mr. Smith on this pattern. The old style of six-wheeled truck passenger-car weighs at least 6 tons net more. One now in the repair-shop weighs 45,910 pounds.

The oldest of these cars have now been in constant use three years, and are as straight and sound as any cars need be. By a system of ventilation the posts are kept sound, and will probably last longer than the large posts of the old style. An accident which occurred some two years ago to a train consisting of two passenger coaches, one of the old and one of the new style, with smoking, baggage, and other cars as usual, will best illustrate their strength and the advantages of lighter weight. A broken rail caused the two coaches to jump the track, and, according to the report of the engineer, they were dragged nearly a mile before the train was stopped. No passengers were injured, and the car-bodies were intact. The frozen ground prevented the ties and track from stripping and wrecking the train. The marked feature, however, was the condition of the trucks under the two cars. The heavy one had pounded the trucks to pieces, and was entirely clear of them and dragging on the ground, while those under the lighter car were so little injured that the cost of repairing did not exceed $20. In one case, there were five or six tons extra weight, and this was enough to destroy the trucks. The pedestals destroyed were on the outside, where the wheels ran over the ends of the ties. Though this test may not be entirely conclusive, yet it was so fair a trial of the endurance of the two styles of car, that few persons would hesitate to give an opinion in favor of the lighter one.

In spite of the disadvantages of the broad gauge as it concerns weight, these cars are as light as any now built. If the same plan were applied to cars of standard gauge of 4 feet 8½ inches, and carried out with the same success, a saving of from 5 to 7 tons per car would be effected. The width of the car would be reduced a foot or more, with a corresponding reduction in weight; while if the length be made so as to seat only 56 passengers, it is probable that the weight per passenger would be much less than 400 pounds. When the number of miles that a passenger-coach runs is taken into account, together with the cost of transporting a ton per mile at passenger speed, the saving effected by reducing the weight of each coach five or six tons is something quite startling.

Four express trains per day run on the Erie road between New-York and Buffalo, a distance of 423 miles; each train averaging five coaches, or twenty per day. Five tons saved on each, which is the mini mum, is 100 tons carried 423 miles, or 42,300 tons one mile. As the cost of transporting express freight on passenger trains is estimated at 1½ cents per mile per ton, the total saving on these four trains alone is $634.50 per day.

THE difficulty of procuring mahogany and other valuable woods, and the consequent exorbitant prices demanded for the same, whether in a crude or manufactured state, have brought into requisition the art of the chemist, and certainly with very satisfactory results. It has been contrived to render any species of wood of a close grain so nearly to resemble mahogany in the texture, density, and polish, that the most accurate judges are incapable of distinguishing between the imitation and the native product.

An Air-Brake Catastrophe.

THERE was a man in Mauch Chunk, a few days ago, with a patent air-brake for railroad cars for sale. He claimed that it would stop a train going at the highest rate of speed, in half its own length. There was a certain railroad man up there who treated this suggestion with scorn, and said he would wager large sums that the air-brake wouldn't stop a train any quicker than any other brake. So he borrowed the contrivance and fixed it on an open car on the Switchback Railroad, and went up to the top of Mount Pisgah to get a fair start. He let her come down the inclined plane for a while until she began to move along at the rate of sixty miles an hour, and then he suddenly placed his foot on the brake and put it on with full power. One minute later, the eye of any solitary traveler passing through those wilds might have observed a car standing perfectly still on the track, and a railroad man going down-hill among the blackberry bushes and under-brush head foremost at the rate of, say of forty-six miles an hour. He was carried home on a stretcher; and now that railroad man not only has perfect faith in the availability of the air-brake, but he is convinced that it would be a good thing if some man would invent a machine for taking the flatness and general demoralization, as it were, out of mutilated noses.—*Exchange.*

The Baldwin Locomotive-Works.

THE Philadelphia correspondent of the *Iron Age* states that the North-Pacific Railway Company has just closed a contract with the Baldwin Locomotive-Works for fifty first-class locomotives, which will be added to forty-eight already purchased, principally from the same works. This road has also purchased 50,000 tons of railroad iron from Pennsylvania manufacturers, besides an immense quantity of spikes, frogs, switches, cars, chains, etc., the outlay for which, in Philadelphia and Pennsylvania alone, during the last eighteen months, has been upward of $5,000,000. As the road goes on, even more in proportion than this immense sum will be expended in this State, showing that the originator and promoter of this enterprise—Jay Cooke—believes in patronizing home industry. The road is now completed to Morehead, a point 260 miles west of Duluth, and goes ahead rapidly, the cash capital being well apace with its construction, as the bond sales for December alone were upward of $1,000,000.

One hears of so many contracts with the Baldwin Works now, that it is difficult to foresee how the work is to be done. With Russia the firm has orders for five hundred first-class engines, fifty for the North-Pacific, large South-American orders, and no end of little jobs of equipping new roads at home. It is a curious fact that, when competing with English works for locomotives, this establishment can "discount" them $1000 on an engine, notwithstanding the higher price of American iron and labor, showing that the manufacturers abroad make money, if the men do not. The great demand upon these works will soon require an extension of facilities; for, with such orders, one locomotive turned out daily will not supply the trade.

WE invite attention to the advertisement of Wakefield's Earth-Closet, which will be found on our eleventh page. The practical utility of this invention is already widely recognized and appreciated, and we think the time will soon come when it will entirely supersede the inconvenient, offensive, and deleterious country privies, which have so long been tolerated as an indispensable nuisance. The device of Mr. Wakefield is worthy of the attention of the public generally, and especially of those having charge of asylums, hospitals, and railway structures. It combines all the essential requisites of an earth-closet, and needs only a trial to secure for it general adoption.

New Publications.

THE *Technologist* begins the new year with a change of name and a new title-page. It is now called *The Industrial Monthly*, and has entered the third year of its publication. It is devoted to mechanics, engineering, rural and city architecture, and improvements in all kinds of machinery and labor-saving devices. The articles are written with unusual care, and many of them are beautifully illustrated, containing practical directions for the erection of cheap and convenient cottages, suburban villas, and out-buildings, laying out grounds, embellishing homesteads, and the various matters pertaining to rural economy. Such a journal is of great value, both in a pecuniary and educational point of view, to all classes of our population, and particularly to farmers and mechanics. Specimen copies sent free by addressing the Industrial Publication Company, 176 Broadway, New-York.

A NEW monthly magazine called *The City* has just made its appearance. It is published by the American News Company, and compares favorably with the best of our monthly periodicals, its contents embracing a variety of interesting articles upon scientific, literary, and artistic topics. It is beautifully illustrated with numerous specimens of the Actinic and Albert-type styles of engraving, and gives a liberal space to the discussion of new enterprises, projected railroads, and public works, and improvements in the arts, architecture, and manufactures. We hope it will receive the encouragement which, judging from the initial number, it so well deserves.

The current number of the *Travelers' Official Railway Guide* is fully up to the standard of previous numbers. A more elaborate, comprehensive, and reliable volume of information, for the convenience of travelers and others, could not well be compiled. Every succeeding number indicates some additional improvement involving labor, forethought, perseverance, and a determination to reach the highest degree of correctness in the matter of details, compatible with the nature of such an undertaking.

The *Atlanta Journal* is the name of a new weekly paper recently started at Atlanta, Ga., and specially devoted to the interests of railways, manufactures, mining, and kindred topics. The few initial numbers we have received indicate ability, and a proper appreciation of the necessity of the right kind of effort in developing the capacities and material resources of the South. A liberal support given to papers of this class will accomplish more in the way of commercial enterprise and progress, by disseminating needed information among the mass of population, than the endless and profitless discussion of political theories and abstractions.

Third Line of Rail.

THE Albany *Journal* says that next season the New-York Central Railway will lay down a third track the entire length of their line. Since the closing of the canals, the management of the road find it impossible to forward the freight intrusted to them with dispatch, and not interrupt passenger travel. So much difficulty of the kind has never before been experienced. At Syracuse, it is proposed to run the freight-cars around the city on the north side, across the head of Onondaga Lake to Geddes, connecting there with the main line again.

THE Lake Shore Railroad Company are making great improvements in their road-way by straightening and leveling and laying double tracks and adding many new turnouts. West of Cleveland, they have recently completed a number of substantial stone bridges and culverts, besides ballasting the road in superior style. The traveling public will gain much by these substantial improvements.

THE reader will find on second page of cover specification of sizes of Vose, Dinsmore & Co.'s stock on hand of French Locomotive Steel Tires.

Wrought-Iron Ties.

THE rapidity with which wooden ties are destroyed in India by the action of the climate and white ants has induced railroad men in England to look for a material which will prove more durable in tropical climates. This has led to the invention of an iron tie, which is described in the following language:

The new sleeper is made up of a number of webs and plates of rolled iron, riveted together, and pierced with bolt-holes for the chairs. This is estimated to save about two thirds of the labor of laying, and leaves but little work to be done by native or other labor. The direct cost is found to be not more than one shilling each above that of the best wooden sleeper, and they are calculated to last ten times as long in tropical countries, and three times as long in Europe. Many eminent engineers and railway constructors, who have examined these sleepers, express great confidence in their superior adaptation.

Improved Spark-Arrester.

AN efficient spark-arrester for locomotives has long been an acknowledged *desideratum*, and the projected improvements in this line have not been few in number. Mr. Luke F. Townrow, Master Machinist D., L. & W. R. R., has devised an appliance of this character, for which a very high degree of superiority is claimed. The smoke from the chamber, in rear of the tubular flues of the boiler, passes through slats adjustable in size to the smoke-stack, which latter is furnished with a screen or diaphragm of wire cloth; the whole arrangement being such as to prevent the escape of the sparks with the draught, and thereby avoiding a very great as well as a very common source of inconvenience.—*Am. Artisan.*

Miscellaneous Items.

MEN are now engaged in erecting novel danger-signals at every bridge and tunnel on the Hudson River Railroad, to warn brakemen, who are compelled at times to run along on the tops of trains, of their near approach to such dangerous places. A pole is erected by the side of the track, and an arm projects from it at the top over the track. From this arm hangs a wire fringe, low enough to strike a brakeman on the front piece of the cap or against the face if he is standing up when the train passes. This perceptibly notifies him that he is only one hundred feet from the bridge or tunnel, and must lie down at once. The blow inflicted by the fringe is momentarily a stinging one, but produces no evil results.—*Syracuse Standard.*

A WRITER says, regarding the newsboy nuisance on railways, "To be able to buy a book, a paper, or cigar, when the idea enters one's head, is well enough; but to have books you don't want, or obscene advertisements and publications, thrown into your lap, often when you are already reading; to be jostled, to receive impertinence on refusal to buy, to be awoke from your nap—all these little things are unpleasant. The evil is not balanced by good. Travelers can always lay in at stations sufficient supplies of reading and edible matter. The car-boy, however necessary in theory, is in practice appreciated by only the lowest class of passengers."

THE Atlantic and Great Western Railway Company has commenced refurnishing that road with rolling stock. The company has contracted with McNarry, Claflin & Co., of Cleveland, for three hundred and thirty new cars, to be used on the Mahoning division.

THE tunnel of the Baltimore and Potomac Railroad, 1550 feet long, under the southern part of Capitol Hill, was completed on the 13th instant. Cars will soon be running over the road between Washington and Baltimore.

O. H. P. ARCHER has been elected Vice-President of the Erie Railway Company in place of James Fisk, Jr., deceased. The office of comptroller has been abolished and an auditing committee, composed of Henry Thompson, H. N. Otis, and John Hilton, appointed instead.

THE best iron cement can be made by preparing a mixture composed of sixteen parts of clean wrought-iron filings, three parts of pulverized sal ammoniac, and two parts of flowers of sulphur. The mixture can be kept in a dry package any length of time unchanged; and, when required for use, it is better to reduce one part of it with twelve parts of iron filings, and enough water, containing a little sulphuric acid, to form a stiff paste. When thus reduced, it must be immediately applied, as it sets rapidly. The author recommends it for joining broken pieces of cast-iron and for stopping large fractures. For very fine work, pure pulverized iron filings, such as apothecaries use, can be substituted for the coarse article.

Some repairs being required to the stone steps leading to a garden, a French mason used Portland cement mixed with finely divided cast and wrought iron filings, and broken-up borings, instead of with sand. The result has been that the mass has become so hard as not to admit of being broken either with hammer or pick-ax.

NICKEL-PLATING has come into such general use that we find it on locomotives, printing-machines, safe-doors, etc. No material has been found which resists the action of the acids, alkalies, etc., so well as the nickel plate. The most effectual way to preserve metallic surfaces is by means of paint; but where ornament is desired, nothing can be used, at moderate expense, which answers the purpose so well as nickel.

GLASS can be cut, as with a diamond, by the use of a file, or other hardened steel, dipped in a solution of turpentine and camphor gum. We have known this to be practiced in glass-works, instead of using the diamond, with good success,

AN INVENTION looking to the improvement of railway axles, or other iron axles, consists in the construction of tubular axles, round, oval, or square, with one or more interior longitudinal strengthening webs or supports. The idea is, to manufacture all sorts of axles, which will be much stronger, lighter, cheaper, and better lubricated than any axle now in use.

A TOURIST traveling continuously without any stoppage can now go around the world in eighty days, making the entire journey by railway and steamship, and going by way of Liverpool, the Suez Canal, Ceylon, Singapore, Hong Kong, Yokohama, San Francisco, and the Pacific Railway.

THE extension of the Flint and Pere Marquette Railway, which completes the connection of the Saginaw region directly with Toledo, and with the East by way of the Lake Shore road, was formally opened by an excursion in which the city officials and principal men of Toledo and the Saginaws participated.

AT the Baltimore and Ohio Railroad Company's rolling-mill in Cumberland, in one day, there were made and finished 338 perfect rails, each 30 feet long, and one rail 72 feet long, the whole making 10,212 feet, weighing (20 pounds to the foot) 204,240 pounds.

THE use of glass for bearings is, as yet, so little practiced as to be subject to skepticism. Yet there can be nothing more reliable, and time will place it where most of the brass, babbitt and type metals is now used. It is an absolute success. Correctness of form is all that is required to carry the point.

THE first locomotive manufactured in this country—by Peter Cooper—weighed a ton. A perfect locomotive, of modern construction, with its tender, weighs fifty tons.

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Lobdell Car-Wheel Works	Wilmington, Del.
Missouri Car and Foundry Co	St. Louis, Mo.
Moore Elastic Car-Wheel Co	Jersey City, N. J.
Mowry Car and Wheel Works	Cincinnati, Ohio.
Ohio Falls Car Co	Jeffersonville, Ia.
Pettengill, Glass & Co	Cleveland, Ohio.
Quealey, W. J	Hannibal, Mo.
Ramapo Wheel & Foundry Co	Ramapo, N. Y.
Scoville, J. & N. C	Buffalo, N. Y.
St. Louis Car-Wheel Co	St. Louis, Mo.
Taylor Iron Works	High Bridge, N. J.
Thompson, Douglas	Bordentown, N. J.
Tredegar Company	Richmond, Va.
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Washburn Car-Wheel Manufacturing Co	Worcester, Mass.
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Woodbury & Company	E. Cambr'ge, Mass.
Wyoming Valley Manufacturing Co	Wilkesbarre, Pa.

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Dickson Manufacturing Co	Scranton, Pa.
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Hinckley & Williams	Boston, Mass.
Manchester Locomotive Works	Manchester, N. H.
Mason, William	Taunton, Mass.
McKay Iron and Locomotive Works	Jersey City, N. J.
Portland Company	Portland, Me.
Pittsburg Locomotive Works	Pittsburg, Pa.
Rogers Locomotive Works	Paterson, N. J.
Rhode Island Locomotive Works	Providence, R. I.
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D			
Dayton & Union	A. J. Keenan	J. F. Feicht	Dayton, Ohio.
Danbury & Norwalk	Charles A. Craig	Wm. W. Bedient	Danbury, Ct.
Dayton & Michigan	William Cullen,	W. H. Allison	Cincinnatti, Ohio.
Delaware, Lackawanna & Western	Walter Dawson	Robert McKenna	Scranton, Pa.
Des Moines Valley	James Lamb	R. E. Smith	Keokuk, Iowa.
Detroit & Milwaukee	B. Briscoe	B. Briscoe	Detroit, Mich.
Delaware & Hudson Canal Co	James Dickson	Thomas Orchard	Carbondale, Pa.
Dorchester & Delaware			Cambridge, Md.
Dubuque South-western			Farley, Iowa.
Dutchess & Columbia			Washington, N. Y.
E			
Eastern		J. P. Somerby	Salem, Mass.
Eastern	John Thompson		East-Boston, Mass.
East-Tennessee & Virginia	Jos. Armbruster	Jos. Armbruster	Knoxville, Tenn.
East-Tennessee & Georgia	Eli Hixon		Knoxville, Tenn.
East-Pennsylvania	J. M. Geary	Samuel Reeves	Reading, Pa
Erie Railway	*E. O. Hill		Susquehanna, N. Y.
Erie Railway	James B. Gregg		
Erie Railway	H. L. Brown	C. A. Smith	Jersey City, N. J.
Erie Railway	M. E. Brown	M. Wilder	Buffalo, N. Y.
Erie Railway	W. E. Cooper	W. E. Cooper	Hornellsville, N. Y.
Erie Railway		W. E. Rutter	Elmira, N. Y
Evansville & Crawfordsville	John L. White	A. Sharra (fore'n)	Evansville, Ind.
Evansville, Henderson & Nashville	Jos. Crawford	W. H. H. Price	Henderson, Ky.
European & North Am. (of Maine)	A. O. Bailey	J. H. Brown	Oldtown, Maine.
Erie & Pittsburg	John Young	John Young	Erie, Pa.
Eldora			Dubuque, Iowa.

* General Master Mechanic. † Mechanical Engineer.

Railroad.	*Master Mechanic.*	*Master Car-Builder.*	*Residence.*
F			
Florida	A. W. Taylor	G. Hernandez	Fernandina, Fla.
Flint & Pere Marquette	Sanford Keeler	Sanford Keeler	East-Saginaw, Mich.
Fitchburg	Geo. A. Cooledge	Enos Varney	Charlestown, Mass.
Fitchburg & Worcester	John Webster	Samuel Stevens	Fitchburg, Mass.
G			
Grand Trunk	*Richard Eaton	J. W. W. McWood	Montreal, Canada.
Galveston, Houston & Henderson	Wm. Macbeth	Wm. Macbeth	Galveston, Texas.
Grand River Valley		James Potts	Jackson, Michigan.
Grand Rapids & Indiana			Fort Wayne, Ind.
Great Western of Canada	*Wm. A. Robinson		Hamilton, Canada.
Georgia	William Hardman	T. M. Preval	Augusta, Ga.
Greenville & Columbia	J. T. Price	J. T. Price	Helena, S. C.
H			
Hanover Branch	John J. Bingley	Henry Britcher	Hanover, Pa.
Hartford & New-Haven	N. Slingland	F. Leppense	Hartford, Ct.
Hannibal & St. Joseph	H. A. Towne	H. C. Whiting	Hannibal, Mo.
Hartford, Providence & Fishkill	Edwin Garfield	V. D. Perry	Hartford, Ct.
Hackensack & New-York	Abra'm Angausen		Hackensack, N. J.
Hastings & Dakota	C. C. Clements		Hastings, Minn.
Housatonic	C. R. Morris	J Ferris	Bridgeport, Ct.
Houston & Texas Central	George Stevens	George Stevens	Houston, Texas.
Houston Tap & Brazoria	A. Malsch	R. H. Yeomans	Houston, Texas.
Huntington & Broad-Top Mountain	D. G. Gilchrist	M. Tellerhoof	Saxton, Pa.
Hempfield	T. Marsh		Wheeling, Va.
Hudson River	Wm. Buchanan	John McKenna	New-York.
Hudson River	John Dykeman	Charles D. Mills	East-Albany, N Y
Houston & Great Northern	T. W. Shellhorn	T. W. Shellhorn	Houston, Texas.
I			
Indianapolis, Cicinnnati & Lafayette			Cincinnati, Ohio.
Indianapolis, Peru & Chicago	John McKenna	John McKenna	Peru, Ind.
Illinois Central	S. J. Hayes	H. O. Wadlie	Chicago, Ill.
Iowa & Missouri State Line			Farmington, Iowa.
Iron	Perry Scott	Clem. Roetling	Ironton, Ohio.
Indianapolis & St. Louis	C. E. Benton	C. E. Benton	Mattoon, Ill.
Indianapolis, Bloomington & Western	J. T. Otis	S. S. Smith	Urbana, Ill.
Ionia & Lansing	H. Loughlin		Lansing, Mich.
J			
Jeffersonville, Madison & Indiana	Reuben Wells	John Higgins	Jeffersonville, Ind.
Jackson, Lansing & Saginaw	Andrew Wilson	A. Wilson	Jackson, Michigan.
K			
Keokuk & St. Paul	P. R. Sutton	Wm. McElroy	Keokuk, Iowa.
Knox & Lincoln			Bath, Maine.
Kentucky Central	J. R. Ledyard	J. L. Hackenthorn	Covington, Ky.
Knoxville & Charleston			Knoxville, Tenn.
Kansas Pacific	L. H. Waugh		Wyandotte, Kansas.
Kalamazoo, Allegan & Grand Rapids			Kalamazoo, Mich.
Kansas City, St. Joseph & Council Bluff	H. L. Cooper	H. L. Cooper	St. Joseph, Mo.
L			
Lake Erie & Louisville	John Pero		Fremont, Ohio.
Lake Superior & Mississippi	W. McFouland	A. Coburn	St. Paul, Minn.
Lackawanna & Bloomsburg	Chas. Graham		Kingston, Pa.
Lebanon Springs			Burlington, Vt.
Lehigh Valley	J. Kinsey		South-Easton, Pa.
Lehigh Valley	P. Hofecker	E. R. Brown	Weatherly, Pa.
Lehigh Valley	A. Mitchell	Mauch Chunk, Pa.	Delano, Pa.
Lehigh Valley	D. Clark		Hazelton, Pa.
Lehigh & Susquehanna	L. C. Brastow	L. C. Brastow	Wilkesbarre, Pa.
Lehigh & Susquehanna	Wm. H. Brown		Mauch Chunk, Pa.
Leavenworth, Lawrence & Gal	S. Philbrick		Lawrence, Kansas.
Lewy's Island	C. W. Button	Damase Merceir	Milltown, Maine.
Little Rock & Fort Smith			Little Rock, Ark.
Little Miami	J. H. Setchel		Cincinnati, Ohio.
London & Port Stanley			London, C. W.
Louisville, New-Albany & Chicago	Jacob Losey	Jacob Losey	New-Albany, Ind.
Long Island	Chs. A. Thompson	B. T. Little	Hunter's Point, L.I.
Louisville, Cincinnati & Lexington	John Skidmore	Theo. G. Shaw	Louisville, Ky.
Louisville & Nashville	Thatcher Perkins	Thatcher Perkins	Louisville, Ky.
Lake Shore & Michigan Southern	†James Sedgley	§John Kirby	Cleveland, Ohio
Michigan Southern Division	William Hill		Elkhart, Ind.
" " "		S. S. Knapp	Adrian, Mich.
Toledo Division	Geo. H. Tier	Frank O. Bray	Norwalk, Ohio.
Erie Division	L. O. Gassett	J. Withyecombe	Cleveland Ohio.
Buffalo Division	B. H. Kidder	D. Sutherland	Buffalo, N. Y.
M			
Marquette & Ontonagon	A. P. Burroughs	H. D. Lyons	Marquette, Mich.
Macon & Augusta			Macon, Ga.
Maine Central	J. W. Philbrick	J. W. Philbrick	Waterville, Me.
Macon & Western	D. M. Gogul	James A. Knight	Macon, Ga.
Manchester & Lawrence	Edward Studley	M. W. Dickerman	Concord, N. H.
Macon & Brunswick	M. Thornton	M. Thornton	Macon, Ga.
Maysville & Lexington			Maysville, Ky.
Marietta & Cincinnati	E. Bosley	E. Bosley	Chillicothe, Ohio.
Memphis, Clarksville & Louisville			Clarksville, Tenn.
Memphis & Little Rock	N. Greener	C. W. Wooldridge	Huntsville, Ark.
Memphis & Charleston	Michael Burk	A. W. Drew	Memphis, Tenn.
Memphis & Charleston	L. M. Sellars	Fabien Varin	Huntsville, Ala.
Miami, Col. & Xenia	J. H. Setchel	M. P. Ford	Cincinnati, Ohio.
Mineral Point	Robert Hay		Mineral Point, Wis.
Mississippi & Tennessee		Henry Teague	Memphis, Tenn.
Mississippi Central	Henry Gibbon	John E. Becton	Water Valley, Miss.
Maryland & Delaware	Samuel Peters		Greensboro, Md.
Mississippi, Gains. & Tus			Gainsville, Ala.
Midland Pacific			Nebraska City, Neb.
Milwaukee & St. Paul	T. S. Davis	Wm. E. Kettridge	Milwaukee, Wis.
Milwaukee & St. Paul		John Baillie	Milwaukee, Wis
Milwaukee & St. Paul	J. Pattee	D. F. Wilson	Minneapolis, Minn.
Michigan Central	A. S. Sweet, Jr	J. B. Sutherland	Detroit, Mich.
Montgomery & West-Point	J. McVey	W. H. Daniels	Montgomery, Ala.
Montgomery & Eufaula	James McCann	I. E. Holmes	Montgomery, Ala.
Mobile & Montgomery	James McFarland	L. Barham	Montgomery, Ala.
Mobile & Girard	William Eyles	A. J. Nix	Girard, Ala.
Mobile & Ohio	L. J. Fleming	John McHugh	Mobile, Ala.
	B. S. Skates	B. S. Skates	Whistler, Ala.
Missouri River, Fort Scott & Gulf	John S. McCrum		Kansas City, Mo.
Missouri, Kansas & Texas	C. T. McIlvaney	J. Townsend	Sedalia, Mo.
N			
Nashville & Chattanooga	John U. Eastman	J. G. Sawyer	Nashville, Tenn.
Nashville & Decatur	C. B. Knowles	C. B. Knowles	Nashville, Tenn.
New-Bedford & Taunton	Robert Chase	Robert Chase	New-Bedford, Mass.
New-Canaan			New-Canaan, Ct.
New-Brunswick & Canada	T. Armstrong	T. Armstrong	S'nt Andrew's, N.B
New Haven & Northampton	Henry Fox	Henry Fox	Westfield, Mass.
New-York & Oswego Midland	Wm. H. Griggs	Wm. H. Griggs	Oswego, N. Y.
New-York & Harlem	Wm. M. Strong	Leander Garey	New-York.
New-York Central	* C. T. Ham	Joseph Jones	Albany, N. Y.
New-York Central	G. B. Van Vorst		Albany, N. Y.
New-York Central	Henry Watkeys		Syracuse, N. Y.

* Mechanical Superintendent. † General Master Mechanic.
‡ General Master Mechanic and Master Car-Builder. § General Master Car-Builder.

Railroad.	*Master Mechanic.*	*Master Car-Builder.*	*Residence.*
New-York Central	Amos Gould		Rochester, N. Y.
New-York Central		Wm. Johnson	Buffalo.
New-York & Flushing			Flushing, L. I.
New-York, Providence & Boston	Jas. H. Anderson	Jas. H. Anderson	Providence, R. I.
New-York & New-Haven	H. Kittendorf	M. C. Andrews	New-Haven, Ct.
New-London Northern	J. W. Dow	S. W. Caulkins	New-London, Ct.
New-Jersey & Transportation Co	John Headden	David H. Baker	Jersey City, N. J.
New-Jersey Southern	Rufus Blodgett	H. A. Webster	Manchester, N. J.
New-Haven & Derby			New-Haven, Ct.
New-Orleans, Opelousas & Gt. Western	John McCluskey	Matthew Nolan	Algiers, La.
New-Lisbon			Leetonia, Ohio.
New-Orleans & Ohio	John R. Jordan	John R. Jordan	Paducah, Ky.
New-Orleans, Jackson & Gt. Northern	John Conlon	Charles Bartine	New-Orleans, La.
New-Haven, Hartford & Springfield			Hartford, Ct.
Naugatuck		George W. Gray	Bridgeport, Ct.
Newark & Bloomfield	Luke F. Tronson		Hoboken, N. J.
Nova Scotia	W. Johnson		Bedford, N. S.
North-Missouri	John Calhoun	C. S. Buck	St. Louis, Mo.
North-Carolina	E. Wade	B. G. Sergeant	Co. Shops, N. C.
New-Orleans, Mobile & Texas	Josiah Bettis	Josiah Bettis	Mobile, Ala.
Northern Central	C. M. Lewis		Baltimore, Md.
Northern Central		G. W. Demarest	York, Pa.
North-Lebanon		Henry B. Oves	Lebanon, Pa.
North-Pennsylvania	Franklin Roop	Franklin Roop	Philadelphia, Pa.
North-Eastern	D. W. Haines	A. M. Corrie	Florence, S. C.
Northern	James W. Lander	Albert Langmaid	Concord, N. H.
Northern of New-Jersey	T. W. Demorest		New-York.
Norwich & Worcester	Richard Colburn	G. R. Bentley	Norwich, Ct.
Northern of Canada	James W. Forster		Toronto, Can.
Norfolk & Petersburg	J. S. Whitworth	J. S. Whitworth	Norfolk, Va.
Northern Pacific		*Geo. W. Cushing	St. Paul, Minn.

O

Ogdensburg & Lake Champlain	William A. Short	J. R. Ames	Malone, N. Y.
Oswego & Syracuse		J. H. Parker	Oswego, N. Y.
Ohio & Mississippi		M. M. Martin	Cochran Shops, Ind.
Old Colony & Newport	J. K. Taylor	A. Gleason	Boston, Mass.
Orange, Alexandria & Manassas	James E. Waddy	John T. Nalls	Alexandria, Va.
Oil City & Pithole	George Thompson		Pithole, Pa.
Oil Creek & Alleghany River	J. S. McElroy	Jacob Williams	Corry, Pa.
Oil Creek & Alleghany	H.J.Bookhammer	John Monks	Oil City, Pa.

P

Panama	Chas. E. Stewart	J. G. Wilson	Aspinwall, N. G.
Pacific of Missouri	E. B. Gibbs	E. B. Gibbs	St Louis, Mo.
Paterson & Newark			Paterson, N. J.
Pennsylvania	*Isaac Dripps		Altoona, Pa.
Pennsylvania	H. D. Garrett	I. W. Van Houten	W. Philadelphia, Pa.
Pennsylvania	M. A. Shattuck	Samuel W. Myers	Harrisburg, Pa.
Pennsylvania	T. W. Worsdell	John P. Levan	Altoona, Pa.
Pennsylvania	D. O. Shaver	R. S. Ramsey	Pittsburg, Pa.
Philadelphia & Erie	T. J. Hamer	George J. Mason	Sunbury, Pa.
	W. L. Foster	Robt. M. Messimer	Renovo, Pa.
	W. L. Holman	Wm. P. Newcomb	Kane, Pa.
	W. T. Smith	David Cowley	Erie, Pa.
Philadelphia, Wilmington & Baltimore	George W. Perry	George W. Perry	Wilmington, Del.
Philadelphia & Reading	John Wootten	Aaron Steinbach	Reading, Pa.
Philadelphia, Germ'n & Norris'n	John Moyer	Nathan Pawling	Philadelphia, Pa.
Philadelphia & Baltimore Central	S. D. Danfield	Samuel D. Danfield	Chester, Pa.
Pittsburg, Cincinnati & St. Louis	James Ball	James Ball	Logansport, Ind.
	Robert Curtis	Theo. Chamberlain	Columbus, Ohio.
	Thomas Denmead		Dennison, Ohio.
	Thomas V. Losee	John Gottschall	Indianapolis, Ind.
		James McGee	Steubenville, Ohio.
Pittsburg, Fort Wayne & Chicago	S. M. Cummings	John Marquis	Alleghany, Pa.
Pittsburg, Fort Wayne & Chicago	J. M. Boon	Wm. Waddington	Fort Wayne, Ind.
Pittsburg & Connellsville	D. P. Rennie	J. M. Rutter	Connellsville, Pa.
Peoria, Pekin & Jacksonville	R. F. Hurd	R. F. Hurd	Pekin, Ill.
Peninsular			Battle Creek, Mich
Portland & Rochester	Jas. S. Drake	Samuel Dean	Portland, Me.
Portland & Kennebec	John Ellis	J. W. Trussel	Augusta, Me.
Portland & Oxford Central	Geo. W. Battles	Geo. W. Battles	Buckfield, Me.
Portland, Saco & Portsmouth	John Donnell		Portland, Me.
Port Royal			Beaufort, S. C.
Port Hope, Lindsay & Beaverton	H. G. Taylor	H. G. Taylor	Port Hope, Can.
Port Huron & Lake Michigan			Port Huron, Mich.
Providence, Warren & Bristol	Rufus Smith	J. Brightman	Bristol, R. I.
Portsmouth, Gt. Falls & Monmouth	James Tucker	E. Fall	Union Village, N.H.
Petersburg	R. B. Adams	Alex. Wright	Petersburg, Va.
Providence & Worcester	Joseph Kelly	Olney L. Smith	Providence, R. I.
Peninsular R. R.	T. G. Templeton		Battle Creek, Mich.

R

Raleigh & Gaston	J. B. Gayle	J. B. Gayle	Raleigh, N. C.
Rensselaer & Saratoga	W. B. Gage		Troy, N. Y.
Richmond, Fredericksburg & Potomac	H. Kuhn	W. H. Trainham	Richmond, Va.
Richmond Danville & Piedmont	John McFarland	H. Longest	Richmond, Va.
Richmond & Petersburg	John O'Brien	J. J. Martin	Richmond, Va.
Richmond & York River			Richmond, Va.
Rome, Watertown & Ogdensburg	Wm. Jackson	H. H. Sessions	Rome, N. Y.
Reading & Columbia	B. Van Lew		Columbia, Pa.
Rome, Georgia	O. W. Harbin	O. W. Harbin	Rome, Ga.
Rochester & Genesee Valley	M. E. Brown	M. Wilder	Buffalo, N. Y.
Rockford, Rock Island & St. Louis	R. D. Grant		Beardstown, Ill.
Rock Island & Peoria			Rock Island, Ill.
Rutland	N. L. Davis	M. M. Crooker	Rutland, Vt.

S

San Francisco & San José	R. B. Bishop	Frank Bellisle	San Francisco, Cal.
St. Croix & Lake Superior			New-York City.
St. Lawrence & Ottawa	Calvin Dame	Calvin Dame	Prescott, Canada.
St. Paul & Pacific	C. N. Parker, Jr.	C. N. Parker, Jr.	St. Paul, Minn.
St. Louis & Iron Mountain	O. A. Haines	Oscar Doolittle	Carondelet, Mo.
Sandusky, Mans. & Newark		Charles Scoeby	Sandusky, Ohio.
St. Joseph Valley			Kalamazoo, Mich.
San Antonio & Mexican Gulf	W. T. Bingham		Victoria, Texas.
South Side of Long Island			New-York.
St. Paul & Sioux City	Jas. G. Butterfield		Shakopee, Minn.
St. Louis, Vandalia, T. Haute & Ind.	C. R. Peddle	H. Kermise	Terre Haute, Ind.
South-Carolina	W. B. Smith	John Reed	Charleston, S. C.
South-Side of Virginia	J. T. Robinett	J. T. Robinett	Petersburg, Va.
South & North-Alabama	Tho. Jeffries	Tho. Jeffries	Lime Station, Ala.
Southern Minnesota	Wm. Lininger		Hokah, Minn.
South-Western of Georgia	C. D. Wall		Columbus, Ga.
South-Western of Georgia	D. M. Gogul	James A. Knight	Macon, Ga.
South Shore	Warren E. Ray		Cohasset, Mass.
Stanstead, Shefford & Chambly	W. H. Smith	M. Sessions	Waterloo, C. E.
Schuylkill & Susquehanna	John E. Wootten	John E. Wootten	Reading, Pa.
Seaboard & Roanoke	J. B. Pendleton	J. B. Pendleton	Portsmouth, Va.
Stonington & Providence	J. H. Anderson	J. H. Anderson	Providence, R. I.
Selma, Rome & Dalton	A. G. Maynes	W. W. Peirce	Selma, Ala.
Sioux City & Pacific	Charles Foster	J. R. Dow	Missouri Val., Iowa
Spartanburg & Union	J. N. Benner	Jacob Rice	Union C. H., S. C.
Sheboygan & Fond du Lac	J. H. Erwin	J. H. Erwin	Sheboygan, Wis.
Sullivan & Erie			Tonawanda, Pa.
Syracuse & Binghamton, N. Y.	B. G. Merrill	B. G. Merrill	Syracuse, N. Y.
Sycamore & Cortland			Sycamore, Ill.
St. Louis & South-Eastern	C. B. Salisbury		Mt. Vernon, Ill.

*Superintendent of Motive Power and Machinery.

Railroad.	*Master Mechanic.*	*Master Car-Builder.*	*Residence.*

T

Taunton Branch			Taunton, Mass.
Tioga	Peres Bonny	D. H. Stratton	Blossburg, Pa.
Texas & New-Orleans	R. B. Baer		Houston, Texas.
Tennessee & Pacific	William McKeand	William McKeand	Nashville, Tenn.
Toledo, Wabash & Western	W. F. Ray		Fort Wayne, Ind.
Toledo, Wabash & Western		David Hoit	Toledo, Ohio.
	T. G. Gorman		Springfield, Ohio.
Toledo, Peoria & Warsaw	A. H. De Clerq	R. M. Hemphill	Peoria, Ill.
Troy & Bennington			Troy, N. Y.
Troy & Boston	Foster Church	R. V. Coon	Troy, N. Y.
Toronto	Grey & Bruce		Toronto, Can.

U

Union Pacific	I. H. Congdon	Geo. E. Stevens	Omaha, Nebraska.
Utica & Black River	John Bailey	David James	Utica, N. Y.
Utica, Chenango & Susquehanna	C. H. Brown		Utica, N. Y.

V

Virginia & Tennessee	F. Sterk	W. A. Morgan	Lynchburg, Va.
Vicksburg & Meridian	Jas. B. Brown		Vicksburg, Miss.
Vineland			Vineland, N. J.
Vermont Central	J. M. Foss	Milton Sessions	St. Albans, Vt.
Vermont & Massachusetts	D. T. Davis	Jacob Marsh	Fitchburg, Mass.
Vermont Valley			Rutland, Vt.

W

Washington, Alex. & Georgetown			Washington, D. C.
Warwick Valley			Warwick, N. Y.
Wicomico & Pocomoke			Berlin, Md.
Wilmington, Charlotte & Rutherford	W. A. Gill	Thomas Myers	Laurenburg, N. C.
Wilmington, Columbia & Augusta	George Hall	W. J. Calais	Wilmington, N. C.
Winchester & Potomac			Winchester, Va.
Westchester & Philadelphia	P. C. Clark	P. C. Clark	Philadelphia, Pa.
Wilmington & Weldon	John Bissit	John Bissit	Wilmington, N. C.
West-Jersey	W. McAllister	C. C. Williams	Camden, N. J.
Western Maryland	R. V. Dohoney	J. H. Nussear	Union Bridge, Md.
Winona & St. Peter	F. C. Ford	H. L. Preston	Winona, Minn
Western North-Carolina	E. H. Marsh	E. H. Marsh	Salisbury, N. C.
Western R. R. N. C.	M. W. Atkinson	M. W. Atkinson	Fayetteville, N. C.
West-Feliciana	R. C. Brower		Woodville, Miss.
Whitehall & Plattsburg			Plattsburg, N. Y.
Western & Atlantic	John H. Flynn	John Sherman	Atlanta, Ga.
Worcester & Nashua	George H Griggs	George H. Griggs	Worcester, Mass.
Welland	William Wells	William Pay	St. Catharine, C. W.
Washington & Ohio	Nathaniel Hayes	Joshua Hamson	Alexandria, Va.

CAR MANUFACTURERS.

Allison, W. C. & Sons	Philadelphia, Pa.
Anderson, J. R. & Co.	Richmond, Va.
Altoona Manufacturing Co	Altoona, Pa.
Adrian Car Co.	Adrian, Mich,
Barney & Smith Manufacturing Co	Dayton, Ohio.
Baker, Jackson & Co	Latrobe, Pa.
Billmeyer & Smalls	York, Pa.
Bradley, Osgood	Worcester, Mass.
Brill & Son	Philadelphia, Pa.
Bitner, George W	Pittsburg, Pa.
Cambridge City Car Co	Cambridge City, Ind.
Canada Steam-Engine Co	Kingston, Canada.
Central Car Manufacturing Co	Jackson, Mich.
Clendenning, W. W	Montreal.
Cummings Car-Works	Jersey City, N. J.
Connellsville Machine and Car Co	Connellsville, Pa.
Detroit Car and Manufacturing Co	Detroit, Mich.
Dawson Manufacturing Co	Dawson, Ga.
Dickey, Neill & Co	Toronto.
Dickson Manufacturing Co	Scranton, Pa.
Erie Car-Works	Erie, Pa.
Elmira Car-Works	Elmira, N. Y.
Fredericks & Co	Catasauqua, Pa.
Gardner, F. & Co.	Carlisle, Pa.
Gill, John L	Columbus, Ohio.
Gilbert, Bush & Co	Troy, N. Y.
Goold, James & Co.	Albany, N. Y.
Goodrich Car Co	Augusta, Ga.
Haskell & Barker	Michigan City, Ind
Harrisburg Car Manufacturing Co	Harrisburg, Pa.
Heathcote, Herbst & Co	Glen Rock, Pa.
Hamilton, William & Son	Toronto.
Harlan & Hollingsworth Co	Wilmington, Del.
Highspire Cooperative Car Co	Highspire, Pa.
Jackson & Sharp Co	Wilmington, Del.
Jackson & Woodin	Berwick, Pa.
Jones, J. M. & Co.	West-Troy, N. Y.
Kimball Manufacturing Co	San Francisco, Cal.
Lombard, Thomas	Augusta, Me.
Lebanon Manufacturing Co	Lebanon, Pa.
Louisville Car-Wheel & Railway Supply Co	Louisville, Ky.
Lehigh Car Manufacturing Co	Stemton, Pa.
Stephenson, John & Co	New-York, N. Y.
Michigan Car Co	Detroit, Mich.
McNairy, Claflen & Co	Cleveland, Ohio.
Murray, Dougall & Co	Milton, Pa.
McVey, Walker & Co	Braddock's Field, Pa.
Mowry Car and Wheel Works	Cincinnati, O.
Middletown Car & Manufacturing Co	Middletown, Pa.
Missouri Car and Foundry Co	St. Louis, Mo.
New-Haven Car Co	New-Haven, Ct.
Ohio Falls Car Co	Jeffersonville, Ind.
Peabody & McDonald	Calais, Me.
Peters, Simon	Quebec.
Pittsburg and McKeesport Car Co	McKeesport, Pa.
Pittsburg Car and Locomotive Co	Pittsburg, Pa.
Portland Co	Portland, Me.
Pullman Car Co	Chicago.
Peregoy, J. H	Houston, Texas.
Quealy, W. J	Hannibal, Mo.
Ranlet Car Manufacturing Co	Laconia, N. H.
Russell & Co	Massillon, Ohio.
Sands, William L	Pottstown, Pa.
Schall, Michael	York, Pa.
Shaaber, W	Reading, Pa.
Southern Car-Works	Independence, La.
Shoenberger & Bryant	Duluth, Minn.
Taunton Car Co	Taunton, Mass
Tredegar Co	Richmond, Va.
Vigo Foundry and Terre Haute Car Works	Terre Haute, Ind.
Wharton, Thomas J	Brunswick, Ga.
Whittaker, Phillips & Co	Toledo, Ohio.
Wason Manufacturing Co	Springfield, Mass
Weimer, P. L. & Bros.	Lebanon, Pa.
Wyoming Valley Manufacturing Co	Wilkesbarre, Pa.
Wells, French & Co	Chicago, Ill.

H. COLBY, Prest. A. L. GRIMES, Sec. E. STURGES, Sr., Treas

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Capacity, Six Cars per Day.

This Company have one of the largest shops in the West, well stocked with the best of tools adapted to the work, and located at a point possessing unrivaled facilities for procuring the

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The Company are prepared to build FREIGHT CARS of every description, and to supply Frogs, and all kinds of Railway Castings, Bridge Bolts, and Wrought Work. Particular attention given to fitting Frogs and Crossings in a thoroughly workmanlike manner.

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Jacks for pressing on Car-Wheels or Crank Pins made to order.

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33	" "	2 55	"	"
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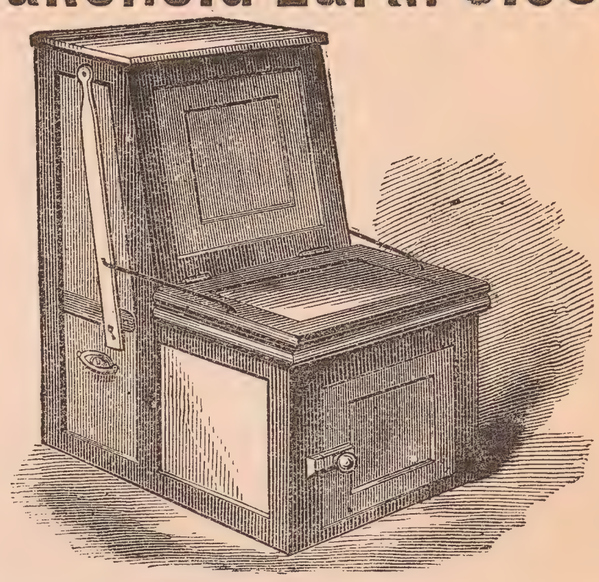

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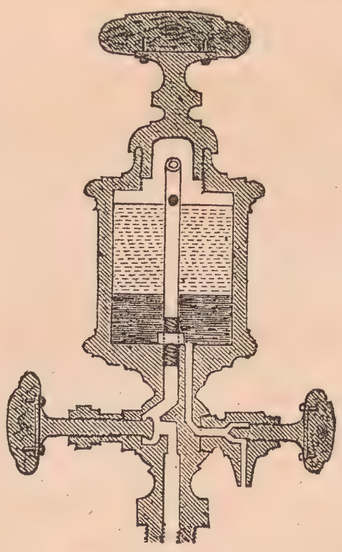

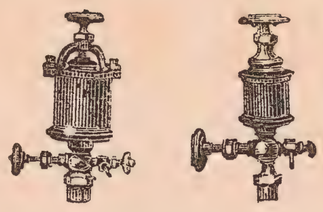

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Their advantages over other lubricators are so striking that it is only a question of time for them to come in general use, their accuracy in keeping the valves and pistons thoroughly and constantly lubricated being unequaled.

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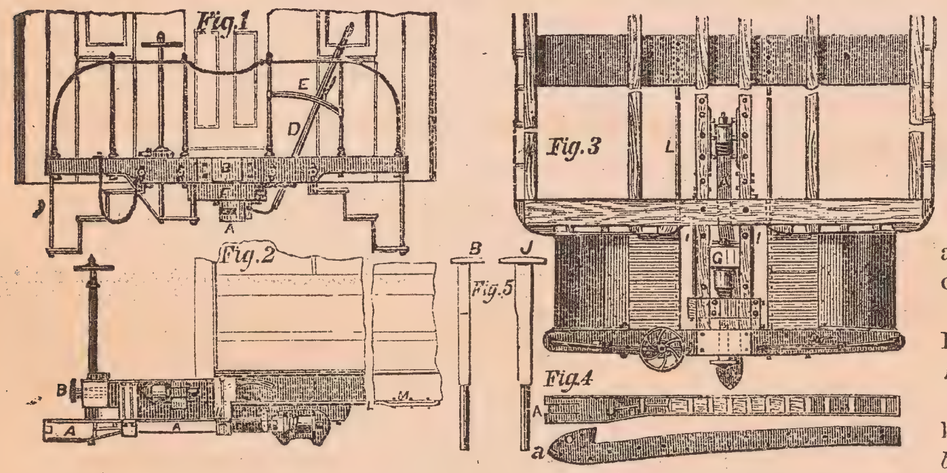

Office, 231 Broadway, (Rooms 4 and 5,) New-York.

Send for Illustrated Pamphlet, and call and see working models. **E. MILLER, Patentee.**

DESCRIPTION.

Figure 1 is an elevation; Figure 2, a longitudinal section; Figure 3, a plan of an end of a car to which the arrangement has been applied: and Figures 4 and 5 show top and side views of the "Hook" and "Buffer," drawn on a larger scale than that of Figures 1, 2, and 3.

The letters refer to the same parts in all the figures. A is the coupling "Hook," B the "Buffer," C the "Stop," D the "Lever," E the "Quadrant Ratchet," F the "Truss Beam," G the "Spring Beam," H the "Suspender Beam," I the "Upward Trusses," K the "Main Spring," L the "Downward Trusses," and M the "Bolster."

The Platforms, instead of being located below the centre line of the main sills of the cars, are placed *in* that line, and held there by the Trusses I and L, so that the point of contact (in Buffers B) is *in* the said centre line and *not below* it.

The coupling "Hook" A is attached to the draw spring the same as the ordinary draw head, and at the same height above the track, but in such a manner that the outer end is free to move laterally for a short distance. The Coupling Hook projects beyond the platform. The Stop C is placed under the Buffer Beam to prevent accidental uncoupling. When two cars are brought together, the Coupling Hooks, from *their shape*, push each other aside, until the Buffers B are compressed hard on the Buffer Springs, then—*the points of the hooks having passed each other sufficiently far*—the Hooks are carried forward by their main-springs, and thus the "*Coupling*" and "*Compression*" are both effected automatically *and at the same time*, and without the use of links and pins. When two cars are thus coupled together, the *head* of the *Hook* of each car is under the Buffer Beam of its opposite car, and the platforms are close together, (about 4 inches apart.) The effect of this is, *one platform can not be forced over the other*, nor can a *child* fall between the platforms; the dust and rain are nearly all shut out; the "Compression" makes the train run steadily, and prevents all jerking at starting and stopping.

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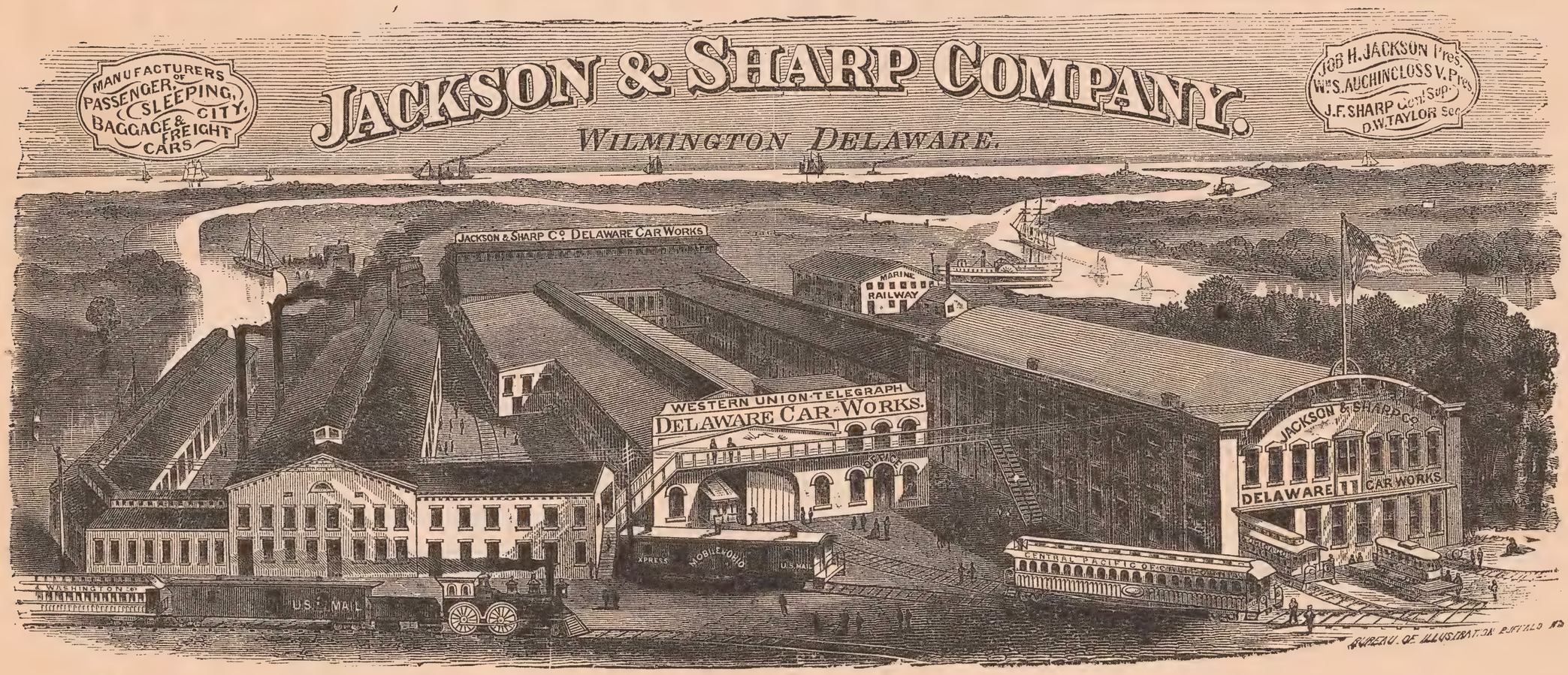

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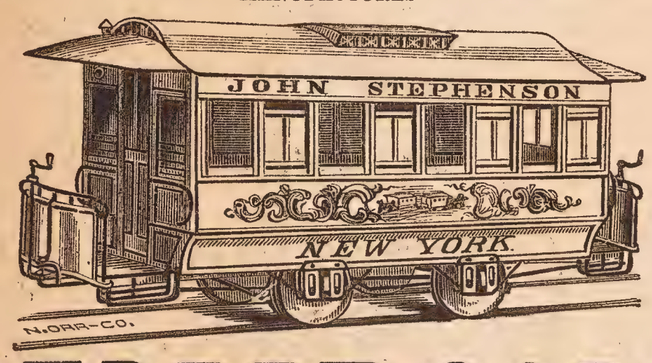

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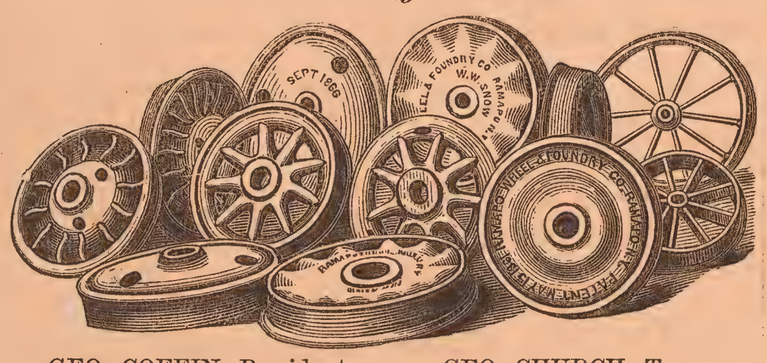

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1¼ " "	30	"
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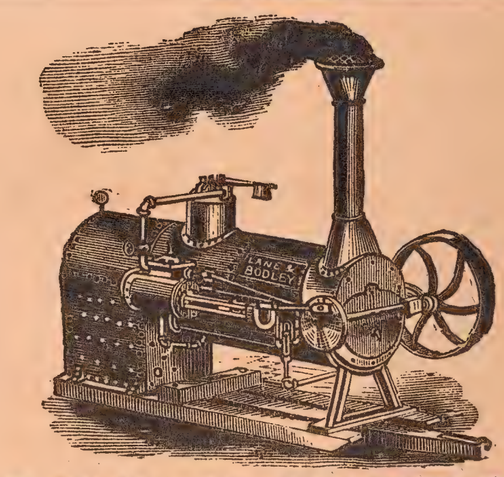

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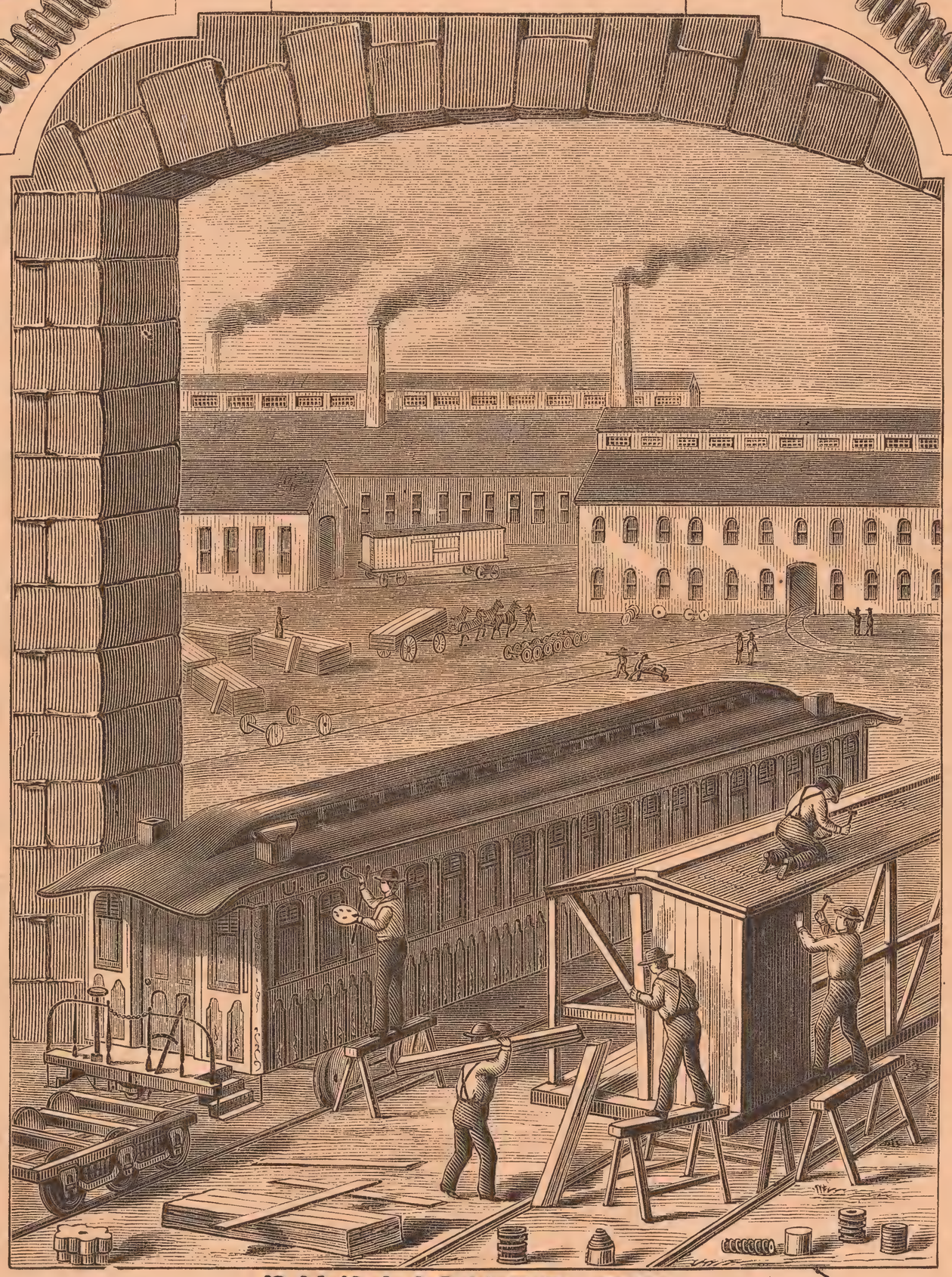
Devoted to the Interests of Railway Rolling Stock.

Vol. II. MARCH 1872. No. 9.



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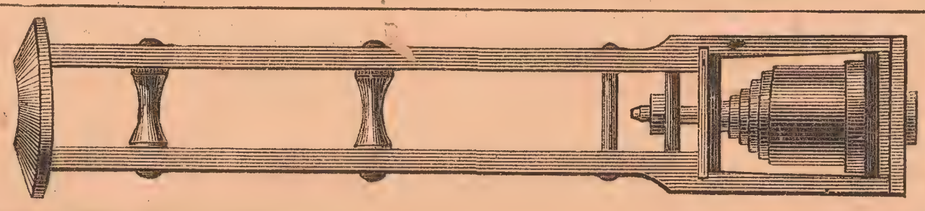

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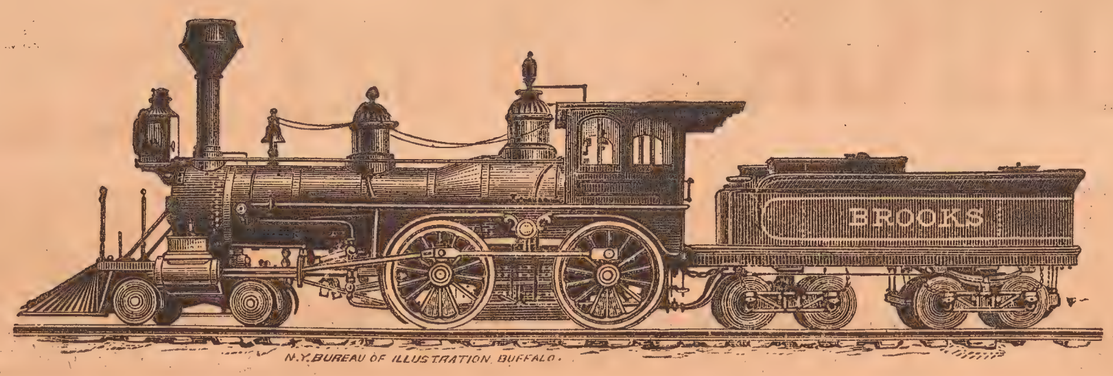

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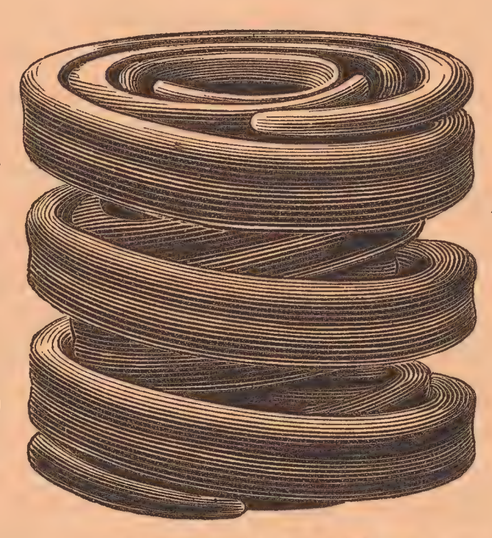

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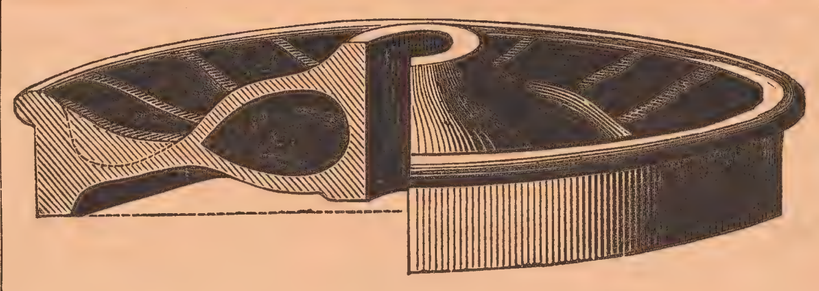

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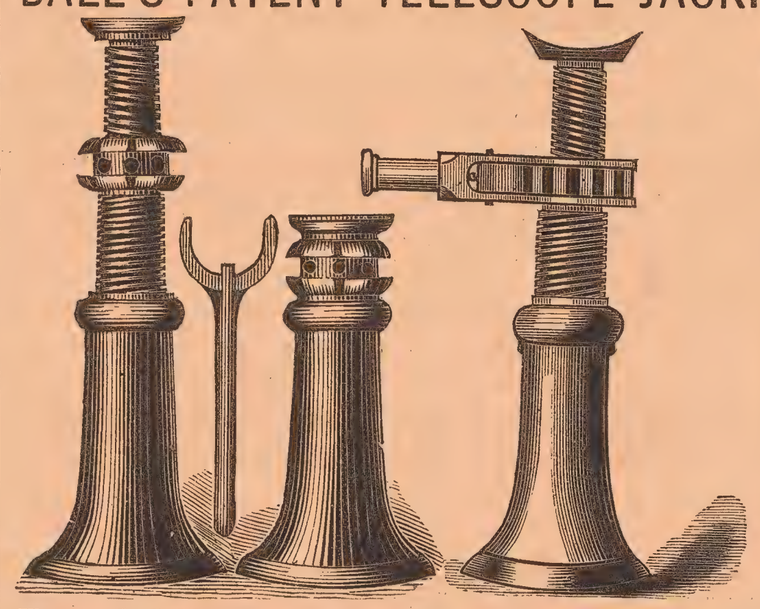

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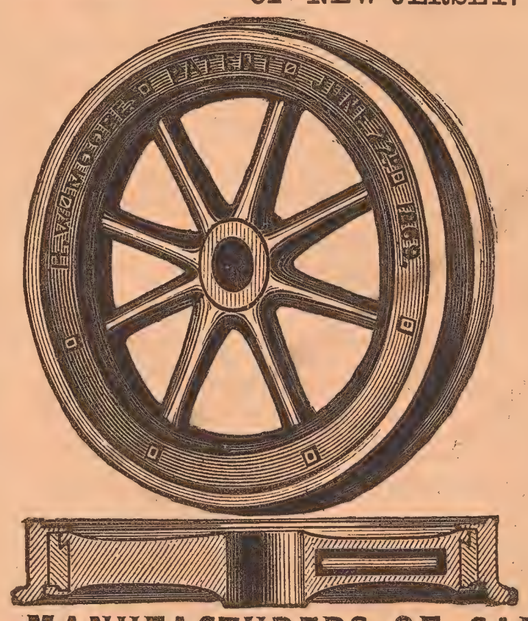

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THE NATIONAL CAR BUILDER.

DEVOTED TO THE INTERESTS OF RAILWAY ROLLING STOCK.

Vol. II. No. 9. } MARCH, 1872. { 50 Cents per Annum. Single Copies, 10 Cents.

The Ramapo Car-Wheel Works.

We copy from the *Berkshire Courier* the following notice of these works, which are located at the village of Ramapo, on the Erie Railway, thirty-three miles from New-York:

"When we trace back the sometimes fatal and terrible consequences resulting from an imperfect car-wheel, or one made of inferior material, we see how great the responsibility resting upon the manufacturers. And all will admit that the Ramapo Wheel and Foundry Company did wisely when, instead of pandering to the prevailing desire for cheap things, affecting corporations as well as individuals, they decided to use brands of iron of a superior quality, in such a combination as repeated experiments proved to be best, and to practice the utmost care and vigilance in the manufacture of the wheels, to produce an article which should be unsurpassed for safety or service, giving a better protection to life and property. That they have done so, is shown by the fact that the Ramapo wheel has been taken as a standard of excellence, and adopted by many of the most prominent railroads in the country for passenger-car service. It is still further shown by the demand for the wheels, which necessitated an enlargement of the works, and their capacity has recently been increased from one hundred and twenty to two hundred and seventy-five wheels a day. We were shown a letter from the managers of the Pennsylvania Central Railroad Company, in which they stated that a pair of Ramapo wheels were placed under a Pullman palace-car, weighing fifty-nine thousand pounds, and was run through between New-York and Chicago, on the fastest time, from August 1st, 1870, to July 1st, 1871, running in that time ninety-six thousand six hundred and twenty-six miles! After that almost unprecedented service, under a heavy car and running at the highest speed—both severe tests of durability—the wheels were taken out, and still being in good condition, were placed under a freight-car, where they may be running yet for aught we know. Such service is the more remarkable when it is known that the average use of car-wheels under ordinary passenger-cars is only forty-five thousand miles, while for those under express trains the average is considerably less. Another letter, from the Superintendent of the Richmond, Fredericksburg, and Potomac Railroad, stated that Ramapo wheels under a car attached to a through express train had run eighty-two thousand four hundred and eight miles, and were still in service. To come nearer home, a pair of Ramapo wheels were put under a locomotive on the Housatonic road, where they were run a distance of eighty-four thousand miles, according to the report of the master mechanic; another pair were put under a passenger-car and run a year, and finally were placed under a freight-car, where they are still in use. Numerous other instances of long-continued use of Ramapo wheels could be cited, but the above are sufficient. Such remarkable results come from the use of Richmond iron, which being stronger than any other American iron, withstands the excessive wear of continuous motion. It has been demonstrated that periods of rest are required to insure great durability of car-wheels, for those under express trains running long and continuous trips are shorter lived than those making frequent stops and short trips, though at the same rate of speed, notwithstanding the more frequent action of the brakes upon the latter. This peculiarity arises from the fact that, by the constant vibration, the molecules of iron are in a measure separated, and their cohesion eventually destroyed. The company use nothing but new metal in the manufacture of all their wheels, and also, all wheels showing the slightest imperfection, are rejected. We saw such an one, which had been condemned for slight defect, stand repeated poundings upon its weakest point with a 35-pound sledge-hammer in the hands of a stalwart workman, while it gave out a sharp, clear ring of defiance in response to every blow.

"The Ramapo wheels are now used under passenger-cars on all the principal railroads in the United States, large shipments of them have been made to railroad companies in South-America, and while at the office, we saw a letter from Russia, making inquiry about the wheels with a view of purchasing some of them as an experiment, as at present the wheels used in Europe are made of wrought-iron, which is less serviceable than the chilled cast-iron wheel. All the Pullman cars are supplied with Ramapo wheels, and over half the truck-wheels put under new locomotives in the country are made at Ramapo. The company received orders for nearly twenty thousand wheels during the last half of 1871, and they have orders for four thousand wheels ahead of manufacture. The new foundry, in addition to their previous works, will increase their capacity for production of good wheels to seventy-five thousand a year, which will enable them to supply the demand, and fill orders at shorter notice.

"The process of casting car-wheels is interesting, and we will briefly describe it. Each moulder—the Ramapo works being large enough to accommodate twelve—has a crane with a sweep large enough to place the moulder of from twenty to thirty wheels. An iron rim, of the shape of the tread and flange of the wheel, is used, and a wood pattern is then put in and fine casting-sand sifted upon to cover the casting surface, and then shoveled in and tamped down. The other side of the mould is made in a similar manner, but before the two are put together, a 'core' made of sand and flour, and baked, is laid in, to make the hollow in the wheel. The two sides are then put together and clamped, and the mould is ready for casting. All the handling of the moulds, as well as pouring in the melted iron and lifting out the red-hot wheels, is done by the crane. As many moulds for wheels are made as there is room in the circle of the crane-arm. While the moulders and helpers have been busy each morning making the moulds, other workmen have been equally busy in filling three or four furnaces with iron and coal. In one of the furnaces they put about twenty tons of pig-iron and four tons of the best Lehigh coal, showing that a pound of coal will melt five pounds of iron. After the fires are started, and the iron begins to melt, which takes only about an hour, more iron and coal are thrown in. An accurate record is kept of the weight and kind of the iron and quantity of coal used each day. A red stream of iron runs out of the furnace into a tipping receptacle, which is operated by steam-power. Little truck-wagons, with pots holding enough metal for a wheel, are backed up to the tank of metal, which is tilted so as to fill the pots on the trucks, and the helpers draw them about the foundry. The trucks and pots are lifted by the cranes, and each moulder easily pours the iron into the moulds he has made. After a few have been filled, he takes off the tops, and lifts the red-hot wheels with the crane; they are then transferred to a sort of windlass suspended from a railroad track overhead, with which they are carried into an adjoining room, where are the 'tempering pits.' These pits are iron cylinders, sunk in the ground, and about sixteen of the red-hot wheels are lowered into them, the top covered, and they are left for two or three days that they may cool gradually, which adds much to their strength and durability.

"The sight in the moulding-room, when the castings are being made, is grand beyond description. The glowing streams of molten iron pouring into the tanks, and from thence into the truck-pots, cast a vivid light upon the workmen and all the surroundings, and put one in mind of a place where 'thin suits' are in constant demand.

"The wheels as made will average about five hundred pounds each, and sell at an average price of $21. Each wheel is numbered, and a record kept of the kinds of iron used, when and by whom made, so that in case it fails, the cause may be traced out. The same careful system is observable through every department of the works. During the casting, tests of the iron are made from time to time, to show that it possesses the proper 'chill'—that is, to see how deep the hardness occasioned by coming in contact with the iron rim in the mould and suddenly cooling, extends. If not just right, other brands of iron are added in the furnace to produce the proper result. A great many styles of wheels are made, including one patented by Mr. Snow, the Superintendent, who seems to have a thorough and comprehensive knowledge of the business in all its details, and is the right man in the right place. Many conveniences and improvements about the foundry, to facilitate work and save labor, have been provided under his direction.

"In the machine-shop are machines for boring the wheels, turning axles, and a hydraulic wheel-press for forcing the wheels on to the axles. While in the shop, we saw wheels, ordered by some railroad company in Connecticut, put on axles at a pressure of fifty tuns, and were told that one hundred and twenty-five tuns had sometimes been exerted by the press in forcing on the wheels. The usual pressure, however, is

March 1872

about thirty-five tuns. With a large boring-machine in the shop, sixty car-wheels have been bored in ten hours. There is also a pattern-shop connected with the establishment, in which workmen are steadily employed in making patterns for new styles or sizes of wheels, or repairing the old ones. The company also make such castings as may be required about the works, which necessitate many patterns.

"The Ramapo Wheel and Foundry Company was organized in 1866, with a capital of $100,000. But little was done the first year; but since organization, one hundred and fifty thousand car-wheels have been made, and the business last year amounted to nearly a million dollars."

Burning up Railway Passengers.

It is evident that stoves must finally be banished from our cars. People will at last refuse to ride in momentary peril of so awful a fate as that of being held fast by an arm or a leg, and slowly roasted to death, like a martyr at the stake. The European plan is to heat one saloon, holding eight or ten passengers. by slipping in under the passengers' feet four portable hot-water holders. This is done at certain stations, the cold tubes being taken away to be refilled for the next train. Those passengers who prefer artificial outside warmth to clothing ought to pay for the accommodation. A few cents of extra fare would pay for such hot-water footstools. Certainly some substitute must be found for the red-hot coal-stove. The last horror occurred on Wednesday, when a passenger train on the Rockford, Rock Island, and St. Louis Railroad came in collision with a freight-train, near Alton, Ill The baggage-car and first coach were "telescoped,' and almost immediately took fire. By eleven o'clock, four bodies had been taken from the wreck. Thirteen persons were injured, several fatally. At last accounts, the wreck had not been cleared, and it was feared that more bodies might be discovered. The responsibility is thrown upon the conductor of the freight-train, Baker, who, it is said, should have backed his train at Alton Junction, instead of going on. He jumped off his train at the moment of collision, and fled. It is stated that one of the victims of the collision was caught in the timbers of the wrecked car by one of his feet, and that all efforts to release him were vain. At his request, an ax was sent for to cut off his foot, but before it arrived, the flames reached him and burned him to death.

The *New-York Post*, in noticing the recent disastrous accident on the Lehigh Valley Railroad, by the breaking of a rail—a cause of serious disaster not uncommon in this country—says an accident has never occurred in Germany from the breaking of rails. In all the thirty or forty years that steam carriages have been running on iron ways, not a person has lost his life nor a person been mutilated from this cause. And, it is added, the reason is plain—scientific men having determined by experiment how long iron will resist, on the average, the bearing of wheels, the law makes it the duty of railroad companies to put down new rails periodically, whether those in use exhibit signs of weakness or not. After a certain wear and tear, they are sure to be weak, though they may not show it, and strong rails are supplied.—*R. R. and Mining Register.*

Remedy for Heated Journals.

When journals heat at sea, the usual custom is to use sulphur, black-lead, or water; but the relief they afford is only temporary. The following is a method that gives permanent relief: When you find the journals getting hot, slack back the nuts on the cap from one quarter to one third of a turn, and supply the journal freely with dust procured by rubbing two Bath bricks together, mixed in oil to a consistency a little thinner than cream. After a short time, begin cautiously to set up on the nuts; and, before finally bringing the nuts to their original position, give a copious supply of oil alone to wash out the journal; then bring the nuts into position, and you will have no further trouble.

A Single Line Railway.

Syria is coming before the world with a railway which, it is claimed by certain English engineers, is better for mining or light traffic than the narrow gauge. We compile a description from a foreign publication. It is novel and cheap, to say the least.

Constructed on the primitive principle of the well-known mule and pannier system, it is simplicity itself. The back and body of the animal are represented by a wall about one yard high on the average, and about one foot thick, on the top or ridge of which a single longitudinal rail and sleeper is to be laid. This wall is, of course, continuous, and may be considered in the light of a deep rail. The rolling-stock answers the purpose of the panniers, and consists of double carriages arranged in pairs, one on either side of the wall, having a free longitudinal passage about fifteen inches between the two. The ingenious inventor represents the wagon when mounted astride the wall in this way as having its two halves hanging on either side of the wall like the legs of a man on horseback. Each carriage, at the under and inner side near its base, is provided with horizontal friction-wheels furnished with springs which preserve the balance by pressing against he wall. When the speed is considerable, these wheels will not touch the wall at all, or at least very little. The locomotive consists of a pair of vertical boilers one on each side of the wall; and the horizontal wheels are so constructed as to grip the wall between them, and thus overcome gradients steeper than even those to be found on Mont Cenis. The brake is on the same system of adhesion; the carriages accommodate eight persons, and the wagons carry two tons; and may be run on this single-line principle at a speed of twenty-five miles an hour. Sidings are provided for by means of segmented turn-tables furnished with one deep rail. Earthworks will scarcely be required; and great economy is promised in the construction of the line in rocky countries, where cutting and tunneling are so often ruinously expensive, and where earth may be wanting for embankment. By the addition of vertical wheels to the locomotive and carriages they may be adapted to any gauge of ordinary railways, or they may travel on common roads.

On the score of cost, it is claimed that this road is built for from $150 to $300 per mile. This feature is sufficiently attractive to capitalists.

The Locomotive.

In the present improved state of this machine, it seems to be a thing almost endowed with human intelligence. It regulates with perfect accuracy and uniformity the number of its revolutions in a given time; it regulates the quantity of steam required to do its work; it opens and shuts its valves with absolute precision as to time and manner; it helps itself to all the water it wants; it oils its own joints, and when any thing goes wrong which it can not itself rectify, it gives timely warning to its attendant. Yet, with all these talents and qualities, and even when fully capable of exerting the power of six hundred or a thousand horses, it is obedient to the hand of a child. Its food is coal or wood, or any thing combustible; it consumes nothing when idle; it never tires or wants to rest or sleep; it is not subject to malady when originally made well, and only refuses to work when worn out with age; it is equally active in all climates, and will do work of any kind; it is a water-pumper, a miner, a sawyer, a tanner, a stone-cutter, a turner, a carpenter, a blacksmith, a cotton-spinner, a weaver, a sailor; in short, it is a mechanic in every branch of art. It has revolutionized the whole domain of human industry, and almost every year is adding to its power and its conquests. In our manufactures, arts, commerce, and our social accommodations, it is constantly achieving what, less than fifty years ago, would have been accounted marvelous or an impossibility; it can engrave a seal, and crush masses of the hardest metal like wax before it; draw out, without breaking, a thread as fine as gossamer, and lift a ship like a feather in the air! It can embroider muslin and forge huge anchors; cut steel into ribbons, and impel loaded vessels against the fury of the wind and waves; and in the shape of a locomotive, or iron horse, it can now be seen daily and hourly dragging after it, on a railroad, hundreds of tons of merchandise and crowds of living freight, in the shape of men or animals, or an army of soldiers with all their munitions of war, at the rate of thirty miles or more an hour.

The locomotive, the most potent and at the same time the most perfectly controllable of all our mechanical agencies, has already been impelled at the flying speed of thirty, forty, and even sixty miles an hour; and if so much has been done already, it would be rash to say or conclude that this is to be its ultimatum. After the results of the last few years, we ask, has it yet reached its limits?—*Brown's History of First Locomotives in America.*

The New Detroit Car-Works.

The building of cars has become one of the great industries of the country, and must necessarily continue such in the future.

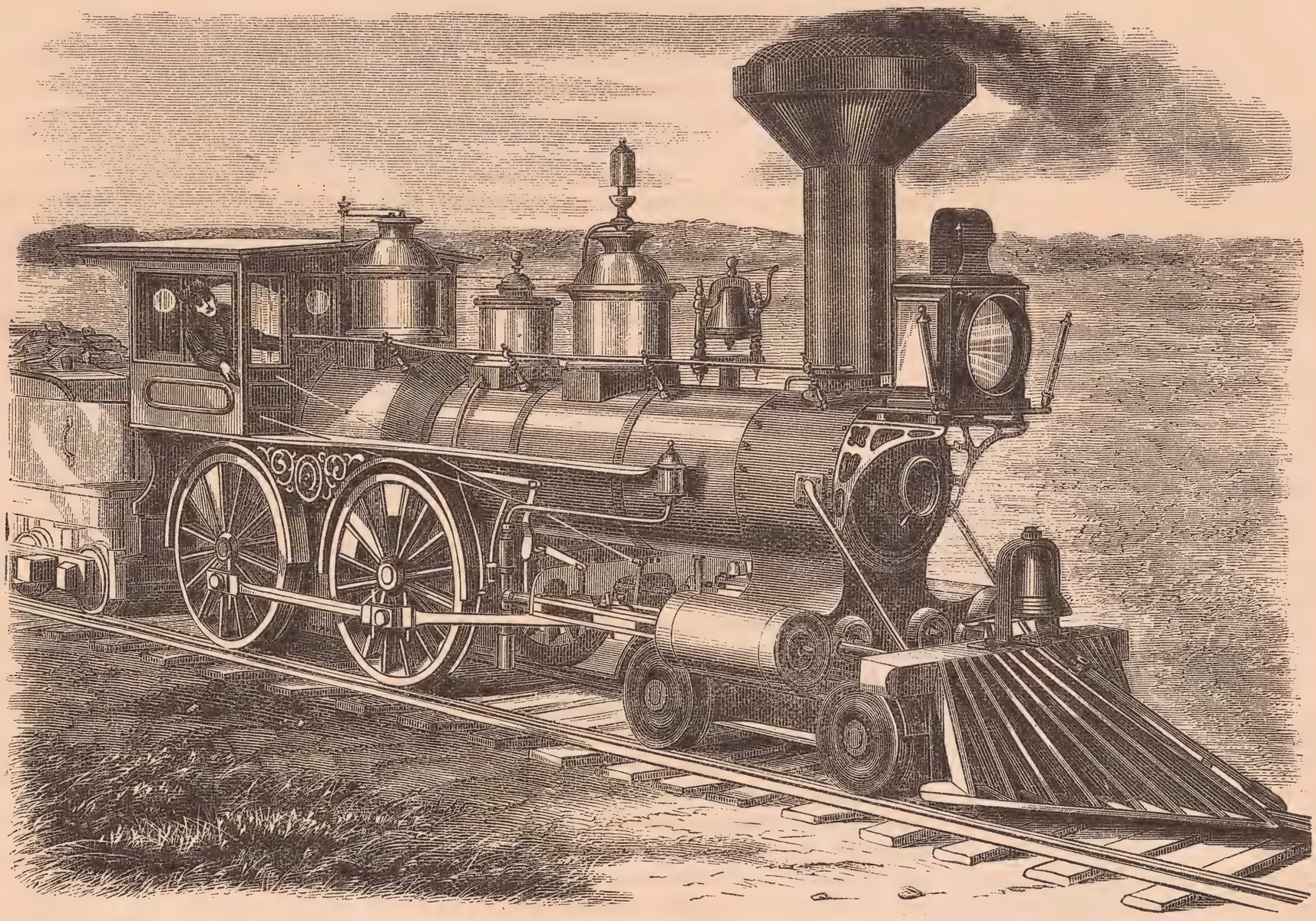
The first cars built in Detroit, outside of the railroad shops, were built by Dr. George B. Russell, on Atwater street, in an old building long known as "Wight's Mill," which the Messrs. Wight had left for their present location. This was fifteen years ago. Dr. Russell transferred this business to new and enlarged buildings on Croghan street. He afterwards organized "The Detroit Car and Manufacturing Company" on that location, which company was remarkably successful, and has now an immense establishment. About five or six years ago, the "Michigan Car Company" was organ ized, and located near the central depot, and all know its success and great extent.

About eighteen months since, the Detroit stockholders of the former company sold all their stock to Mr. Pullman and his friends, of Chicago, and the Croghan street works have since been employed exclusively in the construction of Pullman and palace-cars. Several stockholders of that company joined very reluctantly in that sale, and have ever since had it in contemplation to organize a new company. They have just completed such an organization under the name of the "Detroit Car-Works," and have bought of William B. Ogden a site upon the river on the corner of Adair street. The directors are George H. Russell, E. C. Walker, and A. H. Leavitt. E. C. Walker is President and Treasurer, and G. H. Russell is Secretary.

The site purchased consists of a strip of land 240 feet wide, extending from Wight street to the channel bank of the river, next west of Adair street. Its depth is 600 feet to the water's edge, and 950 feet to the channel bank. The new "Stove Company" have already dredged out the east half of Adair street, 450 feet in from the channel bank. This company will dredge out the west half, making a slip 60 × 30 feet, and giving the car-works a dockage front of 670 feet. The company have also bought the south half of Adair's garden, 150 feet front on Wight street and 380 on Adair street, making the whole area of the grounds when filled out about seven acres. The contemplated street railroad along the river will pass along Wight street, and thus, with the river, will give double facilities for the transportation of cars.

The plans for building, after careful examination of the best shops in the West, have been completed, and the work of erection has already begun. The buildings will be located just south of Wight street, and will consist of an engine-house, 38 by 48 feet; a blacksmith-shop, 38 by 96, to contain 12 fires and a steam hammer; a wood machine-shop, 60 by 90, two stories high, with wings for planers; an iron machine-shop, 48 by 108; a construction-shop for 11 freight-cars, 42 by 198; and another, 72 by 198, for 11 passenger and 22 freight-cars, with a space for transfer-table between the last two buildings, 62 by 218. The plans provide for more than a mile of car track within the inclosure. The company hope to be ready for work by May or June.—*Detroit Post.*

Fig. 1.



Briscoe's Locomotive Alarm-Bell.

THE accompanying engraving represents a continuous ringing or sounding alarm-bell, placed on the front beam of a locomotive engine, for the purpose of warning persons about to cross the railroad, or who may be in its vicinity. The bell, it will be seen by the engraving, is so attached that when the engine goes the bell rings, being struck by the hammer once at each revolution of the driving-wheels. Being placed directly in front of the boiler, the ringing or sound of the bell is seldom heard by the engineer or fireman on the engine, and can not be heard on the train; consequently, it is no annoyance to passengers, while, it is claimed, its position causes the sound to be thrown forward, and conducted, by the earth and the railroad track or rails, so that it can be heard a considerable distance in advance of the train, thus giving timely warning.

Fig. 1 is a perspective view of a locomotive with the alarm attached. Fig. 2 is a diagram showing the details of construction.

A represents the front beam of the locomotive, upon which is properly secured the yoke B, to which the bell is suspended in the following manner: The shank of the bell is turned off smoothly, and inserted through a hole through the top of the frame, which hole is bored to fit the shank of the bell closely, and, at the same time, not so tightly as to prevent the bell from being rotated.

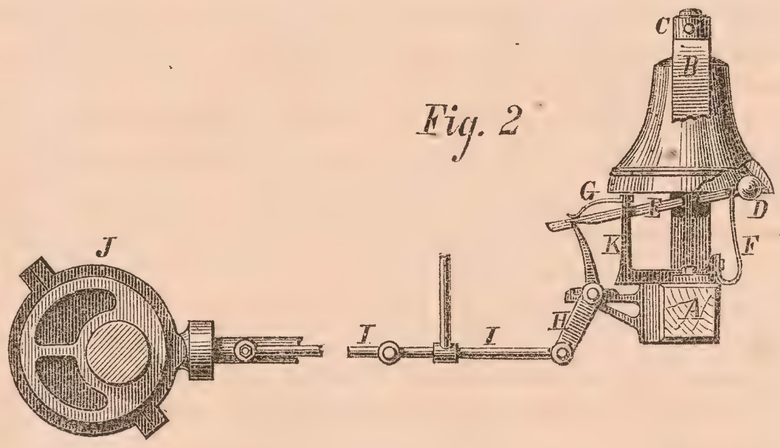
The top of the shank is provided with a proper nut C, by means of which it is held in the yoke, and which rests upon a metal washer, which in turn rests upon a rubber washer, placed on the top of the frame and surrounding the shank. By this means the bell is secured in a vertical position, allowing it no motion but a rotary one about its vertical axis. A hammer D is attached to the lever E. This lever is sustained by the two vertical guides K, and is actuated by a spiral spring F. The lever is also held in position by the spring G, which prevents it from being thrown out of place by the lever H, which is pivoted to a bracket, and has its lower end pivoted to the connecting-rod I, which receives reciprocating motion from the revolution of the eccentric J.

The hammer may be so placed as to impinge against the outer or inner side of the bell, as desired. In either case it is secured—in a position out of the line of the centre of the bell—in such a manner that each stroke of the hammer will rotate the bell a little distance.

The locomotive being in operation, the revolutions of the eccentric communicate a rocking motion to the lever H by means of the connecting-rod. The upper end of this lever engages with a notch on the lower side of the lever E, thereby withdrawing the hammer head from the side of the bell, and compressing the spring F. The lever E being thus withdrawn, is slightly elevated, in the shorter guide, by the lever H, and the latter is disengaged from the notch in the lever E, which is instantly forced down by the spring G, when the recoil of the spring F throws the hammer violently forward against the bell.

A constant and positive action is thus secured; the apparatus, interfering in no way with other working parts of the locomotive, is so placed as to be out of the way, while its position is favorable to throw the sound in advance of the train.

Fig. 2



These bells have been placed on thirty-four of the engines of the Detroit and Milwaukee Railroad; and from the experience of their use, there can be but little doubt that many accidents have been prevented, and many lives saved. The inventor says that, during the two years they have been in use on the road, not a single team or vehicle has been struck at or near a crossing; while such accidents did occasionally occur, causing in some instances loss of life and valuable property, before the alarm-bell was brought into use. The general superintendent of the road also speaks in high terms of the value of the invention, and states that they are now on trial by some other roads. We have no doubt that both railway companies and the public would be benefited by its general introduction. The number of accidents would be diminished, and litigations arising therefrom would be less complicated, especially in cases where there is a disagreement on the part of witnesses as to whether the bell was ringing or not. The application of this improvement would settle all doubts arising from such conflict of testimony, and thus benefit companies; while the certainty of the alarm would prevent accidents arising from neglect.

The invention was patented March 2d, 1869. Any further information respecting it may be obtained by addressing Mr. Benjamin Briscoe, Mechanical Superintendent of the Detroit and Milwaukee Railroad, Detroit, Michigan.

Ventilation in Railroad-Cars.

SOME of the cars recently constructed for, and now running on, the Eastern Railroad, are furnished with neat ventilators, that are fastened to the sides of the car below the windows. They are made of metal, and resemble a small, oblong box, with a lid about ten inches in length by three or four inches in width. On opening the lid, a diaphragm of fine wire gauze may be seen. This is inserted transversely so as to entirely cover the aperture leading to the atmosphere. When a passenger wishes for fresh air, he opens the lid of the ventilator at the side of his seat, and a current is admitted—free, however, from dust and sparks, these being prevented from entering by the wire-gauze diaphragm. Other advantages obtained by them are, that the passengers are not annoyed by draughts, and not liable to take cold, as is the case with open windows. The device is a good one. The ventilators, being all nickel-plated, have a neat appearance, and are really ornamental to the car.

GOVERNOR J. GREGORY SMITH, President of the Vermont Central Railroad Company, and also of the Northern Pacific, is reported to be urging the establishment of a great rolling-mill for steel rails, in New-London, Ct., to employ 600 men, and to be ready to invest $300,000 of his own money and that of his friends in the enterprise. New-London, being distant both from coal and iron, would seem hardly the place for such a mill.

March 1872

Paper Car-Wheels.

BY W. E. PARTRIDGE.

To produce a car-wheel which in all essential points shall meet the demands made upon it, is no easy task. So numerous are these points, and so opposite are they in character, that to combine them all in any one wheel is probably—we will not say absolutely—impossible; because what is impossible in one decade is not necessarily so in the next, owing to the improvements which are constantly being made in methods, processes, and machinery.

It would be comparatively easy to devote an entire article to the many important things required in a car-wheel. The first of these is, that the wheel shall be a circle, or a tolerably near approach to it. In England and on the continent of Europe, the use of steel and wrought-iron enables the manufacturer, by means of the lathe, to give what may be termed a perfect form to the wheel. In this country the manufacturer, seeking cheapness and a freedom from wear upon the tread, has made chilled iron, the material for the tread, form the body of cast-iron also. This sacrifices perfect accuracy at first; but taking the whole life of the wheel into account, they are probably more nearly accurate for a greater length of time than a wrought-iron wheel would be. In strength, the well made wrought wheel has a decided advantage, which on roads in this country is very generally hidden by its greater cost. Combination wheels of various kinds have been proposed for the purpose of uniting the leading advantages of the two styles, but without any great measure of success.

With the constantly increasing weight of cars and high rates of speed, has come a constantly increasing appreciation of the value of springs in protecting the rolling-stock from wear as well as the passengers from unpleasant vibrations and jars. But no matter how carefully the springs are adjusted, two vital points of the car, namely, the trucks, remain unprotected, while at the same time they sustain the whole load. The question was raised long ago as to whether we could get springs under the entire load. The answer was, yes; put them into the wheels, and then even the axles will be to a certain extent protected from the injury of pounding and jarring. For years various plans have been suggested for putting elastic materials into the wheels. Iron tires with wooden centres have been used to a considerable extent. They are, however, subject to several very serious defects, which, in this country at least, impair their value. Rubber promises well, and so does steel, but thus far the expected results therefrom have not been realized.

Although a good deal has of late been said about paper car-wheels, yet very few of those who have seen them know very much about their actual construction or merits. The material seems at first to be a novel one to be employed for such a purpose; but the wheels constructed of it possess some very requisite and desirable qualities—a perfect form, considerable elasticity, great strength and durability, and a facility of repair which is entirely wanting in a chilled wheel. These points, together with the method of construction and the peculiar nature of the material, make these wheels worthy of attention.

The tire is of steel, and, when turned up ready for the filling, is made taper inside, so that the inside diameter on the flange is one eighth of an inch smaller than on the other. The body of the wheel is a paper block made of straw-board, cut into circles thirty inches in diameter, pasted together with ordinary paste, and consolidated under a hydraulic pressure of about three hundred tons. This block, after being slowly dried for nearly two weeks in a dry-house, is turned and fitted in a common pattern lathe. The turning tool is like that used for iron, but the speed is about the same as is used for brass. This block, thus turned to fit the tire, is of course somewhat larger, in order to insure a perfect fit. A hydraulic pressure of about four hundred tons is then used to force the block into its place. The tire is heated nearly to the boiling point of water, thus insuring a perfect bearing when cool.

When the paper block is in the lathe, a suitable hole for a cast-iron hub is bored through the centre. This hub has a wide flange upon one end. Covering the whole of each side of the wheel are two side-plates of Norway iron boiler-plate, which fit against a shoulder turned in the tire. The hub is forced in after these plates are in place, the flange, on its outer end of course, holding the outside plate firmly in its place. Sixteen bolts in the outer edge of the plates run directly through the paper, and hold every thing fast; eight bolts go through the flange of the hub, securing the whole, and making the wheel, so far as its interior is concerned, water-proof. The paper itself is painted before it goes into the wheel, and is perfectly secure against dampness, even if the wheel were not water-tight.

In the fall of 1869, the writer of this article was in Brandon, Vermont, where he accidentally had his attention directed to some peculiar car-wheels in a little shop in the outskirts of the town. A workman said they were made of paper, and that was all the information that could be obtained about them. But during the past week, in a conversation with Mr. Kimball, the inventor of these wheels, the writer learned the history of those he saw at Brandon. They were a part of the first lot made, and were looked upon with great distrust by every body who knew any thing about railroading. They were taken to Rutland, and application made to have them put under a car on the Rutland and Burlington road. Permission was reluctantly given to try them under a wood-car, and in that position they ran about 5000 miles, part of the time carrying a load of 21 tons at a speed which sometimes reached 30 miles an hour. After standing this test, the whole lot of wheels, twelve in number, were sent to Chicago and placed under the Pullman sleeping-car "Dacotah." After running a good while, a pair of these original wheels were taken from under that car and broken up in order to test their condition, when it was found that, excepting the ordinary wear upon the tire, they appeared to be as sound and perfect as when first made. Their cost is about $100, which includes the price of a $42 steel tire. This tire, when worn out and taken off, is worth about half-price to re-roll, while the remainder of the wheel would be in a sound condition, and able to wear out another tire with perfect safety. The writer is informed that the manufacturers of these wheels have a large contract to supply them for the Pullman palace, drawing-room, and sleeping-cars, which, owing to their weight, render an elastic wheel exceedingly desirable—or perhaps, to state it more accurately, a wheel which "deadens the jar."

In a future article something will be said in regard to the material which constitutes the leading feature of these wheels. We will merely say, in conclusion, that it is simply straw-board, the same in all respects as that used in the manufacture of paper boxes, and may be made of wheat, rye, or oat straw.

The First Locomotive in Illinois.

A CORRESPONDENT of the St. Louis *Republican* contributes the following bit to the history of the railroad in Illinois:

"Illinois now has 5725 miles of railroad. The first rail was laid at Meredosia, May 9th, 1838, on the first division of what was called the Northern Cross Railroad. The first locomotive arrived at Meredosia September 6th, 1838, on the steamboat Chartson. This pioneer locomotive was built by Grosvenor, Ketchum, & Co., at Paterson, New-Jersey. It was put on the track, of which eight miles were laid, on the eighth day of November, 1838. The civil engineer, under whose supervision the road was built, and who then and there brought the 'iron horse' into harness—the first in the Mississippi Valley—was George P. Plant, the late President of the Union Merchants' Exchange, and one of the best citizens of St. Louis.

"On that engine, which ran eight miles and returned, were Governor Duncan, of Illinois; Murray McConnell, State Commissioner; James Dunlap and Thomas I. January, contractors; Charles Collins and Miron Leslie, of St. Louis; and the chief engineer of the road, George P. Plant.

"There were then less than 2000 miles of railroad in all the United States. Now there are over 60,000. Yet the first locomotive of the Mississippi Valley only put itself in motion thirty-three years ago last November."

Cincinnati and Terre Haute Railroad.

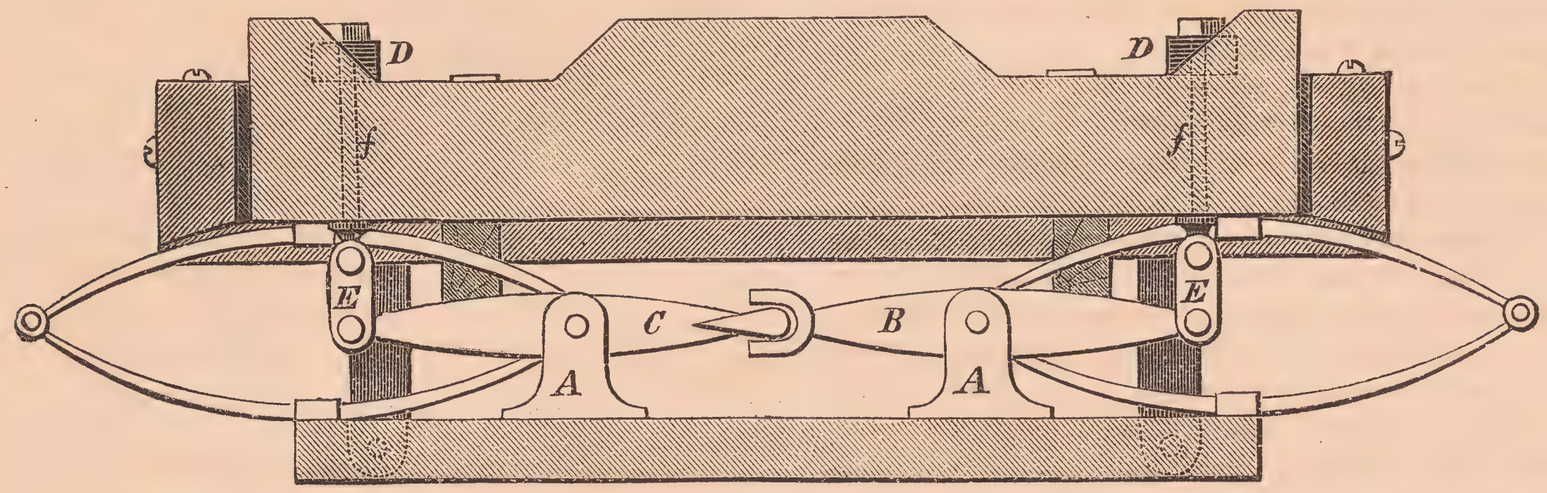
FOR the encouragement of those who cherish fears that the above-entitled railroad will never be built, we will inform them that we are reliably informed that the efficient superintendent of the line, Mr. M. P. Woods, has just closed contracts for four first-class mammoth Baldwin engines to be delivered, one each month, after the ensuing April. A call at the office of the company in this city convinces us that the officers mean business. A full and able corps of the best draughtsmen to be had are there busily engaged making out details of the general arrangement and location of shops, car-houses, etc., etc., while a corps are planning the construction of coaches, baggage, and freight-cars, etc., for the use of the road. These gentlemen draw up the plans under the immediate direction and instruction of Superintendent Woods, who is one of the most experienced railroad men in the country. When the plans of cars are drawn up, the orders are sent to the shops, whence they order cars built on such plans.—*Terre Haute Gazette.*

Application of Air-Power to Street Locomotion, including Tramways.

MR. HURD, of Wakefield, with Mr. Froth, of Leeds, has made a preliminary application for letters-patent for applying compressed air as a motive power for drawing omnibuses and other vehicles, and entirely doing away with horse-power. Should the proposed plan be adopted, it would completely revolutionize our present mode of street traveling, and it is expected to effect a great saving. For carrying out his scheme Mr. Hurd proposes to erect, in some central place in any town, a colossal air-compressing engine, with suitable buildings, the same as gas-works, with receivers, pipes, etc. The mains would be laid in the street on the surface, and in such a way as to form the road, gutter, or even pavement. The air would be sent from the receivers into the pipes, which could be tapped and taken away at such points as might be deemed convenient. Mr. Hurd is engaged, we understand, in preparing a series of models showing the means by which he proposes to carry out his plan.—*Herapath.*

THE holding of a convention of all the narrow-gauge railroad companies in the United States, at St. Louis, on the third Wednesday in June, is attracting the attention of railroad men throughout the country. The facts elicited will settle the question whether railroads of this description will answer the purposes of roads of a wider gauge. It will be ascertained from actual experience what these roads cost; the relative expense of operating them and keeping them in repair and in good condition will be ascertained and what amount of freight they can carry, and whether they are safe and comfortable for passengers as other roads. These will be the questions that will be discussed; and the results of the actual building and running of these roads will be laid before the public in an authoritative shape.

THE Denver and Rio Grande Railway Company have ordered three sample freight-cars of a new pattern, and trucks and wheels, from Philadelphia; and will shortly begin manufacturing their cars at their shops in West-Dover, where they have put up and ready for use all the necessary material.



Graham's Equalizing Passenger-Car Truck.

We issue with this number of The Car-Builder, in the form of a supplement, a working-drawing of Graham's Improved Passenger-Car Trunk; and, in connection therewith, we also insert the above cut and a brief description of the truck which appeared in our issue of November, 1870.

The design of the truck is to equalize the bearing while trains are passing curves, or when passengers get upon one side of the car to avoid the sun, or for other cause; and also to prevent the unpleasant oscillation or rocking of cars arising from an unequal distribution of their weight upon the bearing-surfaces of the truck. The car is attached to the swing-beam or bolster by a central bolt, as usual, and also rests upon the outer ends of the beam, which are supported by two elliptic springs underneath. The beam is also attached to the outside arms of a pair of levers B C, which rest upon their fulcrums A A, and act upon each other by means of a socket connection of their inside arms. In passing a curve, an unequal proportion of the weight of the car—when running on a truck of ordinary construction—is thrown upon one side, depressing the springs upon that side and relieving them on the other. But by means of this device, the unequal pressure upon one side forces down the arm of the lever underneath, which acts upon the other lever by means of the socket connection, and produces a corresponding depression on the opposite side. The beam is thus kept in a uniform position corresponding with the level of the truck-frame. The outside arms of the levers are connected with the beam by two links E E, and the bolts *f f*, the latter passing through India-rubber springs D D, inserted in the swing-beam, making an easy action and avoiding concussion.

The practical effect of this arrangement is to secure at all times an equal distribution of the weight of the car upon both sets of springs, so that neither shall, from causes above referred to, be alternately relieved and overburdened. The chief advantage resulting therefrom is to diminish to a very great degree, if not altogether, the disagreeable oscillating or rocking motion so often experienced and complained of.

Copies of the working-drawing, or any further information, may be obtained by addressing Vose, Dinsmore & Co., 1 Barclay street, New-York.

Improved Cattle-Car.

Mr. S. W. Remer, Superintendent of the Taunton Car Company's works, has lately invented and patented a cattle and freight-car, which promises to be of great utility in the transportation of cattle. A car, thirty feet long by about eight feet wide, is divided into four compartments, which have the capacity of holding four animals each. Instead of being turned in loose the animals are to be tied, side by side, in a lateral position, those in one compartment facing those in the next, thus preventing them from injuring each other, while the oscillation of the car has had no bad effect on them. Another and a greater advantage gained is the arrangement for feeding and watering the stock without removing them. On the top of the car, and extending nearly its entire length, is a large receptacle, divided into three compartments, two for grain and one for water, which can be filled in the same manner as the boiler of a locomotive. By operating simple valves, water or grain can be conveyed to troughs. Live stock can be transported in these cars with less trouble and without the shrinkage sustained by the present mode. When no cattle are offered, these partitions, being hung on hinges, can be swung up and fastened to the top of the car, thus converting them at once into freight-cars.—*Railway Times.*

Miscellaneous Items.

A new passenger depot is now being erected at Richmond, Indiana. The building is 250 feet long by 86 wide; height of towers, 67 feet. It is entered by three tracks, one through the north and two through the south arch. In the south side will be the ladies' and gentlemen's waiting-rooms—the former 20 by 42 feet in size, and the latter 20 by 54; ladies' dressing room, ticket-office, baggage-room, express-office, kitchen, and dining-room. In the west end will be four commodious offices to be occupied by officials of the road. The architecture is of modern style, and superior to that of any other railroad depot in the State. The towers are dressed up with cut stone corners, and crowned with ornamental work of handsome design. The roof is Mansard, and covered with slate, making it substantially fire-proof from without.

Leavenworth claims to have by far the finest and most substantial depot in the West. It was built by the Leavenworth, Atchison, and North-western Railroad Company, the ground being broken in May last. The entire dimensions, including the tower on the north-west corner, are 61 by 202 feet; and the iron supporters of the roof are 25 feet above the track The tower is 18 by 18 and 75 feet high.

The Jackson & Sharp Co., proprietors of the Delaware Car-Works, have recently added to their works a paint-shop, 70 by 405 feet, one half of it being two stories high. It has four tracks on the ground floor, giving room for 28 passenger-cars. The erecting-shop is 65 by 400 feet, with an L 70 by 115 feet, and track room for 22 passenger-cars, and a large working space for cabinet-work. The other buildings, used for machine, blacksmith, and varnish-shops, make up one of the largest establishments in the United States, giving employment to 555 men. This company build many of the Pullman palace-cars, as well as the ordinary passenger-cars, and are now building a number of the "three-feet" narrow-gauge cars for several railroads South and West.

Three new cars have just been obtained for the Toledo, Peoria, and Warsaw Railway, to run through between Columbus, Ohio, and Peoria and Burlington. They are constructed after a new plan lately adopted by Mr. Pullman, and are not by any means a libel on his good taste. In fact, they are exceedingly fine.

Many people now remain home from contemplated trips because of fear of the small-pox. This apprehension is needless, if palace-cars are selected by them, as "all the Pullman palace-car conductors are required to disinfect the coaches under their control immediately after the end of each trip. Burnt carbolic acid is used as the disinfectant; and the purpose is to avoid any risk whatever from small-pox, or any other contagious disease." This precaution is timely, and ought to relieve the anxiety of the traveling public as to danger of the loathsome disease.

The well-known car-shops of Gilbert, Bush & Co., on Green Island, near Albany, were partly destroyed by fire on the 17th ult. Several buildings were partially destroyed, and the total loss is estimated at $40,000 dollars, on which there is an insurance amounting to $22,000. The loss is the greater because the buildings destroyed contained the motive power for the entire works, and some delay must occur in executing orders. The wood-finishing works were not injured.

A European paper gives the following concerning a car said to be in actual use on some railroad on the continent: It is made to seat 84 passengers; 32 on an upper floor, on 8 seats; 50 on the lower floor, on 10 seats; and one seat for two in the upper tier, with places for the conductor and the brake. The car weighs 7600 kilogrammes, or 15,756 pounds, which is at the rate of 204 pounds per passenger.

We yesterday saw, says the Mobile *Register*, the great seal of the United States affixed to a patent for "Improved Car-Trucks," in the name of our townsman Major L. J. Fleming. We recently had occasion to state that "King" Scott and his party spoke in the highest terms of the machinery and work shown them at the Mobile and Ohio Railroad Workshops, under Major Fleming's superintendence. Now it is our pleasant privilege to record another triumph of his tireless and practical ability.

The new rail-mill company at Youngstown, Ohio, lately formed under the name of Valley Iron Company, have their building erected and their furnaces ready. A few months will see them running. Robinson, Rea & Co., of Pittsburg, are now engaged at the large engine. Lewis & Rossiter, also of that city, have the entire contract for the rail-working machinery, which will be the handsomest and most improved of the day. This latter firm have quite a number of steam shears and punching-machines now in process of completion. A double punching and "rail-splitting" machine, having its own engines and weighing, complete, 31,000 pounds, is among the lot.

The Peruvian Government proposes a railroad 14,000 feet above the water. It will connect different parts of the country by railway and steamboats, the former going over the main ridge and valleys of the Andes, at an elevation of 14,000 feet above the level of the sea, or 7000 feet higher than the highest point of the Sierra Nevada crossed by the Central Pacific Railroad. This elevation is within 1000 feet of perpetual snow. Edward H. Spaulding, of Bloomfield, N. J., for four years Assistant-Engineer on the Mont Clair Railway, sailed recently for Peru, in company with some of our best American engineers, who have been selected to accomplish this difficult undertaking.

A road steamer run from Ipswich to Edinburgh by road, a distance of 450 miles, in seventy-seven hours traveling time. The engine is one of four now being built for the Indian Government, under Thompson's patent, with India-rubber tires, and is of 14 nominal horse-power, but which has been worked up to 80 indicated horse-power. Her weight is about 13½ tons: length, 15 feet; breadth, 8 feet 8 inches; height to top of chimney, 15 feet. The omnibus weighs about 3½ tons, and seats 21 passengers inside and 44 outside. The chief difficulties encountered by the engine on her journey appear to have arisen from foraging for water and coal. Since this trip she has made several of an experimental nature, in one of which she took 40 tons of gross load up a hill one mile in length, with an incline of one in seventeen.

Mr. M. E. Brown, Master Mechanic of the Erie Railway at Buffalo, has been nominated as the Democratic candidate for mayor of that city.

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Editorial Announcements.

Correspondence.—*We cordially invite the coöperation of the railroad public in affording us the material for a good mechanical paper. Articles relating to rolling stock and machinery, by those practically acquainted with those subjects, will be gratefully received. All communications must be addressed to Vose, Dinsmore & Co., No.* 1 *Barclay Street.*

The name and address of the writer must accompany all communications designed for publication.

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All communications in regard to advertising should be addressed to L. F. Dinsmore, *Post-Office Box* 4055, *New-York City, who is our agent for advertising, and authorized to make contracts, collections, etc.*

Engravings and Illustrations.

We would invite the attention of Master Car-Builders and others to the advantages to be derived from publishing in The National Car-Builder *engravings designed to illustrate the various features and details of car construction, and especially such improvements as can not otherwise be clearly presented. We will procure cuts to be made in the best manner from drawings or models that may be sent us, and charge only for the cost of engraving, inserting the same in our paper with suitable descriptive details, without charge. The cuts thus made by us, or that may be sent us for use in* The National Car-Builder, *will of course be returned promptly to the owner.*

A Suggestion to our Readers.

We should be glad to receive more frequently than we do the favors of our readers, in the shape of correspondence or otherwise, for publication in The Car-Builder. The usefulness of a journal devoted to the interests of a special branch of mechanical industry is very much enhanced by contributions of this kind. It should reflect the opinions and experience of individuals identified with such industry to an extent that would make it a sort of industrial exchange—a receptacle of ideas gathered from all available sources, to be examined, sifted, arranged, and put in shape for the general use. Every person of average intelligence can, if he tries, contribute something to the common stock, and thus aid in swelling the aggregate amount of information designed for the benefit of all. Especially is this the case with a publication like The Car-Builder, which we send every month to our numerous readers at a subscription-price so low as to be little more than nominal. We should like to give, as far as our space will permit, every individual reader the views of every other reader who has any thing to say that is worth saying in regard to the numerous details of car construction. There is no department of mechanical enterprise more important than this, none more active or progressive, or which promises greater results in its future development. It presents a wide and inviting field for the exercise of inventive skill in devising new expedients and in remedying present defects. Every day gives birth to some new suggestion or discovery in the way of improvement, calculated to promote the comfort of travelers, save expense, diminish wear and tear, and lessen liability to accident. Of all the various parts essential to the harmonious movement of an ordinary passenger or freight-train, not one is so perfect and complete as to admit of no possible change for the better.

Realizing as we do how much might be said upon the subject of car-building that would interest the mass of our readers, and how much we are in want of the necessary data and information to enable us to say it, we are constrained to solicit from master mechanics, master car-builders, and others, expressions of their views, in the shape of contributions to our columns, upon such topics as they may at any time deem worthy of public attention. We should be glad to print, in every issue of our paper, some notice of the work that is being done in the car-shops in every part of the country, with particular and detailed descriptions of passenger-coaches and rolling-stock of every kind. This we could do, if some one in each shop would take the trouble to send us a description of what is being done, specially noting any thing that is new, novel, or peculiar. We well know it is not easy for every one to command the time to write communications of any considerable length; but a great deal more can be written in ten or twenty minutes than many people suppose who are not habitual writers. We are also well aware how disconcerted and nervous some persons will become at the bare idea that what they are writing is to be put in print and subjected to the critical scrutiny of the great, learned, and discriminating public, who, they imagine, will pitch into the grammar and syntax with perfect ferocity. This, however, is altogether a mistake. The general public is not an adept in the matter of literary style. It is not at all fastidious about such things. Grammar is a terrible bugbear when one is afraid of it; but no apparition is in reality more harmless when its presence is ignored. We entreat all who are disposed to write for The Car-Builder, but are deterred from doing so by a distrust of their ability to frame sentences in Addisonian style, to dismiss their fears and write to us *anyhow*. Write us a private, personal letter, and cram as many ideas into it as you can about the matter in hand. Write as *un*grammatical as possible, only let the meaning be clear and unmistakable. We will print what you *mean*, and our word for it, you will not be ashamed to own your bantling when it reaches you, dressed in the garb of beautiful typography, with every word in the right place, and reading like a charm. You will not regret your own trifling sacrifice of time and patience in view of the benefit conferred upon others who are glad to know your views, and will, doubtless, very readily give you theirs in return.

The Buffalo Car Company.

This company are engaged in erecting extensive buildings for their new car-works in Buffalo. The main structure is of brick, some 320 feet long, with walls from 16 to 20 inches thick, and designed so as to afford every facility for carrying on the business of car construction on a large scale. The setting-up shop will accommodate about thirty cars. The most approved machinery will be put in; and, when completed, the works will rank among the largest in the country. The company expect to be ready to receive contracts by May or June next. Mr. J. N. Mileham, of Buffalo, is Superintendent.

By a circular dated February 1st, Mr. H. F. Sweetser, General Manager of the Atlantic and Great Western Railroad, announces the appointment of Mr. C. W. Bradley as superintendent of the second and third divisions of the Franklin branch of that road. Speaking of the appointment of Mr. Bradley, the Cleveland *Herald* says, "Mr. Bradley, although a comparatively young man, has had very large experience in railroad matters, is a practical telegraph operator, and a strict, energetic, and thorough business man."

Correspondence.

Car-Shops in Cleveland.

Cleveland, O., February 14, 1872.

Editor of The National Car-Builder:

Dear Sir: As your journal is devoted to the interests of car-building, I have thought that perhaps a few items relating to the car shops in this city would not be out of place in your columns. Those of the Cleveland, Columbus, Cincinnati, and Indianapolis Railroad Company will receive attention first. They are situated on Merwin street, on what is known as the river flats. As in the case on all roads of note, the mechanical work is divided into two departments—one for locomotives, and the other for cars. Mr. William F. Smith is the master car-builder of the whole line. He is a veteran in the service of this road, his long experience and conceded ability admirably qualifying him for the responsible position he fills.

The car-shop proper is a substantial brick building, two stories high, and stands due east and west. It is 300 feet long, by 70 wide. One half of the first floor is used for setting up cars. There are six tracks which run to a transfer-table on the north side of the shop The rest of this floor is occupied with the wood-working machinery used in heavy work, and also with the iron machine-room, which is located at the west end. The light machinery used in working material for the nside finish of passenger-coaches is found on the second floor, where is also stored a large stock of veneers and fine foreign woods used in the ornamental work which renders the interior of our palace and sleeping-cars so beautiful and attractive. The foreman's office, store-room, varnish-room, and also the upholstery and cabinet-rooms, are on the second floor. Mr. William Cleave is the general foreman of the car-shop, and is well fitted for the position he holds, by his gentlemanly deportment and superior skill as a mechanic.

Mr. Smith has just completed and put in operation an ingenious device for cutting the sloats in car window-blinds. It is placed near the tenon machine, and is connected by a belt to the pulley that runs the sidehead of the latter, thereby turning a hollow perpendicular bit, $\frac{3}{16}$-inch, 2500 revolutions per minute. The stile is placed on a table that will move obliquely just as far as is necessary for the bit to cut in order to make the sloat the proper length. The machine does its work satisfactorily, and promises to be a perfect success.

The blacksmith-shop is a brick building about 120 feet long by 30 wide, and has sixteen fires, and an old-fashioned power-hammer. A new hammer of an improved pattern will be put in the shop at no distant day. The paint-shop is a building 170 by 40 feet, located at the east end of the car-shop, and running north, and containing two tracks with room for six coaches. Mr. M. P. McGregor is the foreman of the blacksmith-shop, and Mr. Grotenroth of the paint-shop.

The car-shops are now running one and a half time, in order to turn out the large quantity of new work ordered. They are now building eight first-class passenger-coaches, six baggage and two postal-cars, and two hundred flats. Besides these, there are being built at contract shops, two sleeping and seven day coaches, and five hundred box, stock, and gondola-cars. The sleeping-coaches are in the Woodruff style, as described in the January number of The Car-Builder. The eight coaches that are being built at these shops are a manifest improvement upon any which have been turned out by them heretofore; and in their general design and details of construction reflect credit on all concerned. They are 51 feet 9 inches long, exclusive of platforms. The Miller platform and buffer are used on all of them. The inside finish will be rich, tasteful, and elegant. The panels will be veneered with mahogany and Hungarian ash; the window-sash and ventilators will be mahogany, the blinds

of cherry, and the dome veneering of rosewood. The door and window-heads are elliptic shape, with mouldings arranged both outside and inside, after a new style. The painting of these cars throughout is unsurpassed in artistic elegance and beauty.

The baggage and postal-cars are certainly modern in style and design, and embody the latest and most desirable improvements in this class of rolling-stock. They are not the dungeons too often found on our railroads, but have raised roofs with free ventilation, and plenty of light.

During the year 1871, there were built at these shops, two drawing-room cars, and a directors' car, which were beautiful specimens of car-building; also three postal-cars, besides repairing a number of old coaches.

I can not refrain from saying, in conclusion, that no more complete, well-arranged, and well-conducted car-shops can be found in the State of Ohio than those I have attempted very briefly to describe. I have seen those elsewhere in this State, and know whereof I affirm. I would also in this connection say further, that if there is any one thing more than another for which the officers of the C., C., C., & I. R. R. are deserving of special commendation, it is the manner in which the services of the men in their employ are appreciated, their interests promoted, and their comfort and well-being provided for. This is attested by the fact that there are men in the service of the road who have been regular employees for twenty years, and others for a period but a little less, and so down.

MACK.

The Dickson Manufacturing Company.

SCRANTON, Pa., February 16, 1872.

EDITOR OF THE NATIONAL CAR-BUILDER:

DEAR SIR: The immense mineral resources of Pennsylvania, consisting almost exclusively of the staple products of coal and iron, are the natural stimulus of manufacturing enterprise, especially in the department of machinery and the various materials required for the development of her mining and railway interests. Everywhere through the length and breadth of the State are to be found the evidences of this development, in numerous mills, factories, and foundries, and in the extensive and increasing traffic of her railways. Among her many thriving interior towns, we doubt if there are any that have made more substantial progress than Scranton, the population of which has increased, within the last decade, from nine to thirty-five thousand, a natural and legitimate result of manufacturing enterprise and the activity thereby imparted to the various branches of trade and industry incidental thereto.

One of the largest and most successful establishments located in this place is the Dickson Manufacturing Company, which has steadily augmented its facilities for the construction of locomotives, stationary engines, steam-boilers, railway-cars, and the various kinds of machinery required in mining operations, until it has scarcely a rival in the magnitude of its business within the limits of the State. It is under the efficient control and management of Mr. George L. Dickson, who is the President of the Company, and whose long experience in the manufacture of machinery, and practical knowledge of the wants of the contiguous iron and coal regions, give him peculiar qualifications for the position he fills. He has the aid of competent assistants; and every department is so thoroughly organized, so systematic and methodical in the matter of details, that every thing goes on with the regularity of clock-work. Mr. W. B. Culver is the General Superintendent, who gives special attention to the mechanical department, prepares the drawings for new work, makes estimates, etc. He is the inventor of a safety-carriage or elevator for hoisting loaded coal-cars from the mines, the advantages of which have brought it into general use in the coal regions.

The machine-shop, of which Mr. Howell Green is foreman, is a frame building, 120×70, and three stories in height. Here all the finishing and fitting up are done. It is provided with new and improved machinery and every convenience for handling heavy work, the first floor being used for this kind of work, the second for tools and work of a lighter kind, and the third for patern-making. A vertical engine of 300 horse-power for the Catasauqua Rolling-Mill is being built in this shop, and is nearly ready for delivery. Adjoining this building is a fire-proof apartment where patterns and drawings are kept, also drawing instruments and tools. Mr. Sidney Broadbent, an experienced and practical draughtsman, acts as assistant superintendent, and has charge of all the shops. The foundry is also adjoining the machine-shop. It is a brick building, 276×63, and fronting on a wide street. All the castings, both iron and brass, are made here. About fifteen tons of metal are cast every day, and a very superior quality of work is produced. Mr. James Cowan is the foreman. The blacksmith-shop is a new brick building, 110×65, and contains three steam-hammers, ranging from one to six thousand pounds, two heating-furnaces, and twenty-five fires. Here all the forging is done. The foreman is Mr. George Parton. The boiler-shop is a new brick building of suitable capacity, in which one hundred and twenty-five men are employed in getting out boiler work. Mr. Robert Clark is foreman.

Nearly half a mile from these shops is another branch of the establishment called the Cliff Works, of which Mr. John Swift is the superintendent. It is a brick building, 240×66, and two stories high, fitted up in the best manner with the most improved tools and machinery for the building of locomotives, of which five are turned out every month. Connected with this is another building, 100×80, and two stories high, used for preparing material for cars, which after being dressed is taken to the erecting-shop, a frame building, 100×50, where the cars are finished and got ready for delivery. The capacity of this shop is ten four-wheel coal-cars, or four box or gondola-cars per day. Contiguous to the locomotive and car-shops are a lumber-yard, blacksmith, and machine-shops, and other necessary facilities for prosecuting the main work. Charles Vetter is foreman of the car-shop, Oscar Freeman of the blacksmith-shop, Daniel Evans of the machine-shop, and Willard Carpenter of the planing-mill.

The Dickson Manufacturing Company employ over a thousand men, and do an annual business of over three millions of dollars. It has a shop at Wilkesbarre, in which over a hundred men are employed. It also owns much valuable real estate. It is emphatically a progressive institution, constantly improving its capacities and turning its resources to good account. The foregoing brief summary of its works necessarily conveys but an imperfect idea of their real character and magnitude. To be appreciated, they must be seen, and the many parts and details carefully observed.

ANTHRACITE.

Car Ventilation.

TERRE HAUTE, IND., February 7, 1872.

EDITOR OF THE NATIONAL CAR-BUILDER:

DEAR SIR: A few weeks ago, it was my fortune to fall into the hands of a doctor—not of divinity but of physic—who persuaded me that my system was deranged, and that I was in danger of going into a decline unless I gave heed to a little professional advice which he proceeded to give me. I must inhale fresh air, wear red flannel, have a change of scene, and knock around in a promiscuous and reckless sort of way. This, of course, implied traveling; and as the old-fashioned stages are out of the question, and a buggy is not quite the thing for a journey at this inclement season, there seemed to be no alternative but a railway-car of some kind. Now, Mr. Editor, I always had a weakness for ventilation. Fresh air is my hobby. I have bestridden it ever since in my juvenile days I read about the Black Hole of Calcutta. I have worried my brain trying to devise some plan by which an ordinary railway-car can be supplied constantly with fresh air of a uniform temperature from bottom to top, and not too cold for comfort. As yet, I have taken out no patent for such a boon to winter travelers. I wanted to travel as the doctor recommended; but feared the remedy would be worse than the disease, especially after reading the article on ventilation in the January number of THE CAR BUILDER. My case, however, would admit of no temporizing. I resolved to take the chances, and if any thing bad came of it, the doctor would be saddled with the responsibility. Cherishing a feeble hope that your article might have stirred up some of the soulless corporations to make new regulations about the ventilation of crowded cars, I started on my trial trip, by taking a first-class car and a fast train on a solvent, dividend-paying, well-managed road, that had advertised for years its perfect system of ventilation. In the centre of the car was a nice-looking stove, with a nice fire in it; and I noticed some queer-looking boxes running from floor to roof on each side opposite the stove. These, I thought, must be the ventilators which will spout the fresh air into the car of a medium summer temperature, and we shall have nothing to do but enjoy it and silently thank the president, superintendent, and directors. Little by little the car filled up, until every seat was occupied—a sort of mixed assemblage, like the materials of Nebuchadnezzar's image, the gold, silver, brass, iron, and clay were packed together indiscriminately. There was the unmistakable business man, a sprinkling of babies, a few commercial travelers, a clergyman, a couple just married, and so on. No one seemed to be traveling for pleasure. I inferred this from the air of quiet resignation with which each and all—the newly-married couple included—seemed to submit themselves to the inevitable. As soon as the train got fairly out of town, the brakeman began to fire-up. The stove had an excellent draught, especially when the train went fast. In went the wood, and hotter and hotter grew the stove. There was a mingled odor of baked peanuts and doughnuts proceeding from the juvenile people, besides a complication of other smells not easily traced or analyzed. The temperature on the line of the passengers' heads was about ninety; at the roof a good deal higher; and on the floor a great deal lower. The ventilation was all a sham—a miserable pretense. There was none whatever. Suffocation would have been inevitable had it not been for the little air that got in through cracks and crevices, and by an occasional opening of the doors. My brain throbbed, my throat and lungs refused to perform their functions; and I was glad to take my umbrella and things and "go ashore," before completing the half of my contemplated journey. I shall not try traveling again, as a remedy for disordered health, until summer comes, and I can have the car-window up and enjoy the—dust and cinders. But I hope, Mr. Editor, you will not let the subject of ventilation go to sleep because it happens to be my hobby; and I trust that mechanics, inventors, and scientific men will not cease their efforts until the problem is solved whether railway-cars in winter can be properly ventilated, and suffering passengers supplied with FRESH AIR.

How to Use a Grindstone.

1. DON'T waste the stone by running it in water; but if so, don't allow it to stand in water when not in use, as this will cause a soft place.

2. Wet the stone by dropping water on it from a pot suspended above the stone, and stop off the water when not in use.

3. Don't allow the stone to get out of order, but keep it perfectly round by the use of a piece of gas-pipe or a hacker.

4. Clean off all greasy tools before sharpening, as grease or oil destroys the grit.

5. Observe: When you get a stone that suits your purpose, send a sample of the grit to the dealer to select by; a half-ounce sample is enough, and can be sent in a letter by mail.

April 1872

Notices of Publications.

THE *Chicago Railway Review*, after a brief sojourn at St. Louis, has returned to Chicago, which will hereafter be its permanent place of publication. It has recently been enlarged, and is now issued in folio form, and printed on fine tinted paper, presenting a very neat and attractive appearance. Its ample pages contain a great variety of interesting matter pertaining to our railway system, including editorials, correspondence, selected articles, and a well-digested summary of current railway news. It is now one of the handsomest papers of its class in the country. The proprietor, Mr. D. C. Brooks, has associated with him in its publication Mr. A. S. Higgins. Under the able editorial supervision of these gentlemen, the *Review*, we doubt not, will sustain the high reputation it has already won among railway men as an enterprising and reliable journal, in all respects worthy of its name. Good fortune was never better deserved.

THE *American Manufacturer and Trade of the West*, published weekly at Pittsburg, Pa., ranks among the first journals of its class as an organ of the great manufacturing interests of which that city is the nucleus. Its columns contain a great variety of information relative to the condition and progress of manufacturing industry, which, in connection with its ample and conspicuous advertising pages, render it a valuable medium of communication between manufacturer and consumer. Its editorials are well written, its illustrations appropriate, and its news summary full and comprehensive. Every manufacturer should have it.

THE *Manufacturer and Builder* begins the year in a new dress, which can not fail to add to the varied attractions of its columns, replete as they are with practical information upon all matters of interest in the useful arts, inventions, and scientific progress. We are glad to see such substantial evidence of its success as is afforded by the contents of the February number. Published by the Engineers' and Manufacturers' Publishing Company, 37 Park Row, New-York. Price, $2 a year.

WE have received the first number of *The Coal and Iron Record*, a handsome weekly journal of sixteen pages, published by Western & Company, 37 Park Row. It is embellished with illustrations, and contains much valuable and interesting matter pertaining to the specialties indicated by its name. It will be under the editorial and business supervision of Mr. Benjamin R. Western, one of the founders of the *Manufacturer and Builder*.

WE beg to direct the attention of our readers to the advertisement of the *Railroad Gazette*, which will be found on our eighth page. As a medium of information for all who are directly or indirectly interested in railroads, it is not surpassed by any other journal. The discussion of the various important problems of mechanical engineering is one of its leading features. The editorial department is ably conducted, its correspondence varied and interesting, its illustrations numerous and excellent, and its weekly news summary full and complete. No railway official should be without it.

Facetiæ.

CLERGYMAN to man burying his fourth wife: "The Lord has indeed afflicted you." The mourner, sobbing, replied, "Yes, yes, he has;" and pausing a moment, and wiping his nose, he continued, "But I don't think the Lord got much ahead of me, for as fast as he took one, I took another."

THE prettier the foot and ankle, the easier it gets up stares.

WHEN James T. Brady first opened a lawyer's office in New-York, he took a basement room which had previously been occupied by a cobbler. One day an Irishman entered. "The cobbler's gone, I see," he said. "I should think he had," tartly responded Brady. "And what do ye sell?" he asked, looking at the solitary table and a few law-books. "Blockheads," responded Brady. "Be gorra," said the Irishman, "ye must be doing a mighty fine business—ye hain't got but one left."

WHEN a Bergen girl gets kissed, she calmly remarks, "Hans, tat ish good;" and when a Block Island girl receives a buss, she exclaims with considerable animation, "Well, John, you've wiped my chops off beautiful!" And when the shade of a moustache sweeps across the tulips of a Boston girl, she cries out in ecstasy, "O Walter! d-d-do so some more!"

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April 1872

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Chicago & N. W. Iowa Division	C. C. Elliott	Wi liam Campbell	Clinton, Iowa.
Chicago & N. W. Peninsula Division	S. L Pierce		Escanaba.
Chicago & Alton	John A. Jackman	R. Reniff	Bloomington, Ill.
Chicago, Burlington & Quincy	C. F. Jauriet	W. W. Wilcox	Aurora, Ill.
Chicago, Cincinnati & Louisville	C. F. Kidder	D. B. Howe	La Porte, Ind.
Chicago, Rock Island & Pacific	T. B. Twombly	B. K. Verbryck	Chicago, Ill.
Chicago, Michigan & Lake Shore	E. I. Reynolds		St. Joseph, Mich.
Cleveland, Col., Cin., & Indianapolis	L. S. Young	William F. Smith	Cleveland, Ohio.
Cleveland and Pittsburg	N. E. Chapman	N. E. Chapman	Cleveland, Ohio.
Cleveland, Mt Vernon & Delaware	J. W. Holloway	J. W. Holloway	Akron, Ohio.
Cincinnati, Hamilton & Dayton	William Cullen	W. H. Allison	Cincinnati, Ohio.
Cincinnati & Zanesville	Peter Green	D. J. Jewell	Lancaster, Ohio.
Cincinnati & Indianapolis Junction	J. H. Keith	W. W. Degnacey	Cambridge, Ind.
Cincinnati, Sandusky & Cleveland	John Y. Beatty	William Earick	Sandusky, Ohio.
Columbus, Chicago & Indiana Central	(See Pitts. Cinn. & St. Louis)		
Concord	E. Studley	M. W. Dickerman	Concord, N. H.
Concord & Claremont	J. N. Lander	A. Langmaid	Concord, N. H.
Connecticut River	John Mulligan	R. Hitchcock	Springfield, Mass.
Contoocook River			Concord, N. H.
Conn. & Passumpsic Rivers	Horace Alden	Horace Alden	Lyndon, Vt.
Cumberland Valley	A. S. Hull	C. W. Nitterhouse	Chambersburg, Pa.
Cumberland & Pennsylvania	W. L. Jordan	J W. Sauerbach	Mt. Savage, Md
Central of Georgia	B. Boulineau	C. C. Millar	Savannah, Ga.
Central of New-Jersey	*T. W. Peeples	George Hackett	Elizabethport, N. J.
Central Branch Union Pacific	Wm. D. Rowley		Atchison, Kansas.
Central R. R. of Iowa	W. J. Ribley	W. J. Ribley	Eldora, Iowa
Central Pacific	A. J. Stevens	Benjamin Welch	Sacramento, Cal.

D

Dayton & Union	A. J. Keenan	J. F. Feicht	Dayton, Ohio.
Danbury & Norwalk	Charles A. Craig	Wm. W. Bedient	Danbury, Ct.
Dayton & Michigan	William Cullen,	W. H. Allison	Cincinnatti, Ohio.
Delaware, Lackawanna & Western	Walter Dawson	Robert McKenna	Scranton, Pa.
Des Moines Valley	James Lamb	R. E. Smith	Keokuk, Iowa.
Detroit & Milwaukee	B. Briscoe	B. Briscoe	Detroit, Mich.
Delaware & Hudson Canal Co	James Dickson	Thomas Orchard	Carbondale, Pa.
Dorchester & Delaware			Cambridge, Md.
Dubuque South-western			Farley, Iowa.
Dutchess & Columbia		H. A. Webster	Fishkill, N. Y.

E

Eastern		J. P. Somerby	Salem, Mass.
Eastern	John Thompson		East-Boston, Mass.
East-Tennessee & Virginia	Jos. Armbruster	Jos. Armbruster	Knoxville, Tenn.
East-Tennessee & Georgia	Eli Hixon		Knoxville, Tenn.

* Mechanical Engineer.

Railroad.	*Master Mechanic.*	*Master Car-Builder.*	*Residence.*
East Pennsylvania	J. M. Geary	Samuel Reeves	Reading, Pa
Erie Railway	*E. O. Hill		Susquehanna, N. Y.
Erie Railway	James B. Gregg		
Erie Railway	H. L. Brown	C. A. Smith	Jersey City. N. J.
Erie Railway	M. E. Brown	M. Wilder	Buffalo, N. Y.
Erie Railway	W. E. Cooper	W. E. Cooper	Hornellsville, N. Y.
Erie Railway		W. E. Rutter	Elmira, N. Y
Evansville & Crawfordsville	John L. White	A. Sharra (fore'n)	Evansville, Ind.
Evansville, Henderson & Nashville	Jos. Crawford	W. H. H. Price	Henderson, Ky
European & North Am. (of Maine)	A. O. Bailey	J. H. Brown	Oldtown, Maine.
Erie & Pittsburg	John Young	John Young	Erie, Pa.
Eldora			Dubuque, Iowa.

F

Florida	A. W. Taylor	G. Hernandez	Fernandina, Fla
Flint & Pere Marquette	Sanford Keeler	Sanford Keeler	East-Saginaw, Mich.
Fitchburg	Geo. A. Cooledge	Enos Varney	Charlestown, Mass.
Fitchburg & Worcester	John Webster	Samuel Stevens	Fitchburg, Mass.

G

Grand Trunk	†Richard Eaton	J. W. W. McWood	Montreal, Canada.
Galveston, Houston & Henderson	Wm. Macbeth	Wm. Macbeth	Galveston, Texas.
Grand River Valley		James Potts	Jackson, Michigan.
Grand Rapids & Indiana			Fort Wayne, Ind.
Great Western of Canada	†Wm. A. Robinson		Hamilton, Canada.
Georgia	William Hardman	T. M. Preval	Augusta, Ga.
Greenville & Columbia	J. T. Price	J. T. Price	Helena, S. C.

H

Hanover Branch	John J. Bingley	Henry Britcher	Hanover, Pa.
Hartford & New-Haven	N. Slingland	F. Leppense	Hartford, Ct.
Hannibal & St. Joseph	H. A. Towne	H. C. Whiting	Hannibal, Mo.
Hartford, Providence & Fishkill	Edwin Garfield	V. D. Perry	Hartford, Ct
Hackensack & New-York	Abra'm Angausen		Hackensack, N. J.
Hastings & Dakota	C. C. Clements		Hastings, Minn.
Housatonic	C. R. Morris	J Ferris	Bridgeport, Ct.
Houston & Texas Central	George Stevens	George Stevens	Houston, Texas.
Houston Tap & Brazoria	A. Malsch	R. H. Yeomans	Houston, Texas.
Huntington & Broad-Top Mountain	D. G. Gilchrist	M. Tellerhoof	Saxton, Pa.
Hempfield	T. Marsh		Wheeling, Va.
Hudson River	Wm. Buchanan	John McKenna	New-York
Hudson River	John Dykeman	Charles D. Mills	East-Albany, N. Y
Houston & Great Northern	T. W. Shellhorn	T. W. Shellhorn	Houston, Texas.

I

Indianapolis, Cicinnnati & Lafayette			Cincinnati, Ohio.
Indianapolis, Peru & Chicago	John McKenna	John McKenna	Peru, Ind.
Illinois Central	S. J. Hayes	H. O. Wadlie	Chicago, Ill.
Iowa & Missouri State Line			Farmington, Iowa.
Iron	Perry Scott	Clem. Roetling	Ironton, Ohio.
Indianapolis & St. Louis	C. E. Benton	C. E. Benton	Mattoon, Ill.
Indianapolis, Bloomington & Western	J. T. Otis	S. S. Smith	Urbana, Ill.
Ionia & Lansing	H. Loughlin		Lansing, Mich.

J

Jeffersonville, Madison & Indiana	Reuben Wells	John Higgins	Jeffersonville, Ind.
Jackson, Lansing & Saginaw	Andrew Wilson	A. Wilson	Jackson, Michigan.

K

Keokuk & St. Paul	P. R. Sutton	Wm. McElroy	Keokuk, Iowa.
Knox & Lincoln			Bath, Maine.
Kentucky Central	J. R. Ledyard	J. L. Hackenthorn	Covington, Ky.
Knoxville & Charleston			Knoxville, Tenn.
Kansas Pacific	L. H. Waugh		Wyandotte, Kansas.
Kalamazoo, Allegan & Grand Rapids			Kalamazoo, Mich.
Kansas City, St. Joseph & Council Bluff	H. L. Cooper	H. L. Cooper	St. Joseph, Mo.

L

Lake Erie & Louisville	John Pero		Fremont, Ohio.
Lake Superior & Mississippi	W. McFouland	A. Coburn	St. Paul, Minn.
Lackawanna & Bloomsburg	Chas. Graham		Kingston, Pa.
Lebanon Springs			Burlington, Vt.
Lehigh Valley	J. Kinsey		South-Easton, Pa.
Lehigh Valley	P. Hofecker	E. R. Brown	Weatherly, Pa.
Lehigh Valley	A. Mitchell	Mauch Chunk, Pa.	Delano, Pa.
Lehigh Valley	D. Clark		Hazelton, Pa.
Lehigh & Susquehanna	L. C. Brastow	L. C. Brastow	Wilkesbarre, Pa.
Lehigh & Susquehanna	Wm. H. Brown		Mauch Chunk, Pa.
Leavenworth, Lawrence & Gal	S. Philbrick		Lawrence, Kansas.
Lewy's Island	C. W. Button	Damase Merceir	Milltown, Maine.
Little Rock & Fort Smith			Little Rock, Ark.
Little Miami	J. H. Setchel		Cincinnati, Ohio.
London & Port Stanley			London, C. W.
Louisville, New-Albany & Chicago	Jacob Losey	Jacob Losey	New-Albany, Ind.
Long Island	Chs. A. Thompson	B. T. Little	Hunter's Point, L. I.
Louisville, Cincinnati & Lexington	John Skidmore	S. S. Pilson	Louisville, Ky.
Louisville & Nashville	Thatcher Perkins	Thatcher Perkins	Louisville, Ky.
Lake Shore & Michigan Southern	*James Sedgley	‡John Kirby	Cleveland, Ohio.
Michigan Southern Division	William Hill		Elkhart, Ind.
" " "		S. S. Knapp	Adrian, Mich.
Toledo Division	Geo. H. Tier	Frank O. Bray	Norwalk, Ohio.
Erie Division	L. O. Gassett	J. Withyecombe	Cleveland Ohio.
Buffalo Division	B. H. Kidder	D. Sutherland	Buffalo, N. Y.

M

Marquette & Ontonagon	A. P. Burroughs	H. D. Lyons	Marquette, Mich.
Macon & Augusta			Macon, Ga.
Maine Central	J. W. Philbrick	J. W. Philbrick	Waterville, Me.
Macon & Western	D. M. Gogul	James A. Knight	Macon, Ga.
Manchester & Lawrence	Edward Studley	M. W. Dickerman	Concord, N. H.
Macon & Brunswick	M. Thornton	M. Thornton	Macon, Ga.
Maysville & Lexington			Maysviille, Ky.
Marietta & Cincinnati	E. Bosley	E. Bosley	Chillicothe, Ohio.
Memphis, Clarksville & Louisville			Clarksville, Tenn.
Memphis & Little Rock	N. Greener	C. W. Wooldridge	Huntsville, Ark.
Memphis & Charleston	Michael Burk	A. W. Drew	Memphis, Tenn.
Memphis & Charleston	L. M. Sellars	Fabien Varin	Huntsville, Ala.
Miami, Col. & Xenia	J. H. Setchel	M. P. Ford	Cincinnati, Ohio.
Mineral Point	Robert Hay		Mineral Point, Wis.
Mississippi & Tennessee		Henry Teague	Memphis, Tenn.
Mississippi Central	Henry Gibbon	John E. Becton	Water Valley, Miss.
Maryland & Delaware	Samuel Peters		Greensboro, Md.

* General Master Mechanic. † Mechanical Superintendent.
‡ General Master Car-Builder.

Railroad.	*Master Mechanic.*	*Master Car-Builder.*	*Residence.*
Mississippi, Gains. & Tus			Gainsville, Ala.
Midland Pacific			Nebraska City, Neb.
Milwaukee & St. Paul	T. S. Davis	Wm. E. Kettridge	Milwaukee, Wis.
Milwaukee & St. Paul		John Baillie	Milwaukee, Wis.
Milwaukee & St. Paul	J. Pattee	D. F. Wilson	Minneapolis, Minn.
Michigan Central	A. S. Sweet, Jr	J. B. Sutherland	Detroit, Mich.
Montgomery & West-Point	J. McVey	W. H. Daniels	Montgomery, Ala.
Montgomery & Eufaula	James McCann	I. E. Holmes	Montgomery, Ala.
Mobile & Montgomery	James McFarland	L. Barham	Montgomery, Ala.
Mobile & Girard	William Eyles	A. J. Nix	Girard, Ala.
Mobile & Ohio	L. J. Fleming	John McHugh	Mobile, Ala.
	B. S. Skates	B. S. Skates	Whistler, Ala.
Missouri River, Fort Scott & Gulf	John S. McCrum		Kansas City, Mo.
Missouri, Kansas & Texas	C. T. McIlvaney	J. Townsend	Sedalia, Mo.

N

Nashville & Chattanooga	John U. Eastman	J. G. Sawyer	Nashville, Tenn.
Nashville & Decatur	C. B. Knowles	C. B. Knowles	Nashville, Tenn.
New-Bedford & Taunton	Robert Chase	Robert Chase	New-Bedford, Mass.
New-Canaan			New-Canaan, Ct.
New-Brunswick & Canada	T. Armstrong	T. Armstrong	S'nt Andrew's N.B
New Haven & Northampton	Henry Fox	Henry Fox	Westfield, Mass.
New-York & Oswego Midland	Wm. H. Griggs	Wm. H Griggs	Oswego, N. Y.
New-York & Harlem	Wm. M. Strong	Leander Garey	New-York.
New-York Central	* C. T. Ham	Joseph Jones	Albany, N. Y.
New-York Central	G. B. Van Vorst		Albany, N. Y.
New-York Central	Henry Watkeys		Syracuse, N. Y.
New-York Central	Amos Gould		Rochester, N. Y.
New-York Central		Wm. Johnson	Buffalo.
New-York & Flushing			Flushing, L. I.
New-York, Providence & Boston	Jas. H. Anderson	Jas. H. Anderson	Providence, R. I.
New-York & New-Haven	H. Kittendorf	M. C. Andrews	New-Haven, Ct.
New-London Northern	J. W. Dow	S. W. Caulkins	New-London, Ct.
New-Jersey & Transportation Co	John Headden	David H. Baker	Jersey City, N. J.
New-Jersey Midland	J. E. Wiggins	J. E. Wiggins	Godwinsville, N. J.
New-Jersey Southern	Rufus Blodgett		Manchester, N. J.
New-Haven & Derby			New-Haven, Ct.
New-Orleans, Opelousas & Gt. Western	John McCluskey	Matthew Nolan	Algiers, La.
New-Lisbon			Leetonia, Ohio.
New-Orleans & Ohio	John R. Jordan	John R. Jordan	Paducah, Ky.
New-Orleans, Jackson & Gt. Northern	John Conlon	Charles Bartine	New-Orleans, La.
New-Haven, Hartford & Springfield			Hartford, Ct.
Naugatuck		George W. Gray	Bridgeport, Ct.
Newark & Bloomfield	Luke F. Tronson		Hoboken, N. J.
Nova Scotia	W. Johnson		Bedford, N. S.
North-Missouri	John Calhoun	C. S. Buck	St. Louis, Mo.
North-Carolina	E. Wade	B. G. Sergeant	Co. Shops, N. C.
New-Orleans, Mobile & Texas	Josiah Bettis	Josiah Bettis	Mobile, Ala
Northern Central	C. M. Lewis		Baltimore, Md.
Northern Central		G. W. Demarest	York, Pa.
North-Lebanon		Henry B. Oves	Lebanon. Pa.
North-Pennsylvania	Franklin Roop	Franklin Roop	Philadelphia, Pa.
North-Eastern	D. W. Haines	A. M. Corrie	Florence, S. C.
Northern	James W. Lander	Albert Langmaid	Concord, N. H.
Northern of New-Jersey	T. W. Demorest		New-York.
Norwich & Worcester	Richard Colburn	G. R. Bentley	Norwich, Ct.
Northern of Canada	James W. Forster		Toronto, Can.
Norfolk & Petersburg	J. S. Whitworth	J. S. Whitworth	Norfolk, Va.
Northern Pacific		†Geo. W. Cushing	St. Paul, Minn.

O

Ogdensburg & Lake Champlain	William A. Short	J. R. Ames	Malone, N. Y.
Oswego & Syracuse		J. H. Parker	Oswego, N. Y.
Ohio & Mississippi		M. Constant	Cochran Shops, Ind.
Old Colony & Newport	J. K. Taylor	A. Gleason	Boston, Mass.
Orange, Alexandria & Manassas	James E. Waddy	John T. Nalls	Alexandria, Va.
Oil City & Pithole	George Thompson		Pithole, Pa.
Oil Creek & Alleghany River	J. S. McElroy	Jacob Williams	Corry, Pa.
Oil Creek & Alleghany	H.J.Bookhammer.	John Monks	Oil City, Pa.

P

Panama	Chas. E. Stewart	J. G. Wilson	Aspinwall, N. G.
Pacific of Missouri	E. B. Gibbs	E. B. Gibbs	St Louis, Mo.
Paterson & Newark			Paterson, N. J.
Pennsylvania	†Isaac Dripps		Altoona, Pa.
Pennsylvania	H. D. Garrett	I. W. Van Houten.	W. Philadelphia, Pa.
Pennsylvania	E. L. Caum	Samuel W. Myers.	Harrisburg, Pa.
Pennsylvania	Grow Stratton	John P. Levan	Altoona, Pa.
Pennsylvania	D. O. Shaver	R. S. Ramsey	Pittsburg, Pa.
Philadelphia & Erie	T. J. Hamer	George J. Mason.	Sunbury. Pa.
	W. L Foster	Robt M.Messimer.	Renovo, Pa.
	W. L. Holman	Wm. P. Newcomb.	Kane, Pa.
	W. T. Smith.	David Cowley	Erie, Pa.
Philadelphia, Wilmington & Baltimore	George W. Perry.	George W. Perry.	Wilmington, Del.
Philadelphia & Reading	L. B. Paxson	Aaron Steinbach.	Reading, Pa.
Philadelphia, Germ'n & Norris'n	John Moyer	Nathan Pawling.	Philadelphia, Pa.
Philadelphia & Baltimore Central	S. D. Danfield	SamuelD.Danfield.	Chester, Pa.
Pittsburg, Cincinnati & St. Louis	James Ball	James Ball	Logansport, Ind.
	Robert Curtis	Theo. Chamberlain.	Columbus, Ohio.
	Thomas Denmead		Dennison, Ohio.
	Thomas V. Losee.	John Gottschall.	Indianapolis, Ind.
		James McGee	Steubenville, Ohio.
Pittsburg, Fort Wayne & Chicago	S. M. Cummings	John Marquis	Alleghany, Pa.
Pittsburg, Fort Wayne & Chicago	J. M. Boon	Wm. Waddington.	Fort Wayne, Ind.
Pittsburg & Connellsville	D. P. Rennie	J. M. Rutter	Connellsville, Pa.
Peoria, Pekin & Jacksonville	R. F. Hurd	R. F. Hurd	Pekin, Ill.
Peninsular			Battle Creek, Mich
Portland & Rochester	Jas. S. Drake.	Samuel Dean	Portland, Me.
Portland & Kennebec	John Ellis	J. W. Trussel.	Augusta, Me.
Portland & Oxford Central	Geo. W. Battles	Geo. W. Battles.	Buckfield, Me.
Portland, Saco & Portsmouth	John Donnell		Portland, Me.
Port Royal			Beaufort. S. C.
Port Hope, Lindsay & Beaverton	H. G. Taylor	H. G. Taylor	Port Hope, Can.
Port Huron & Lake Michigan			Port Huron, Mich.
Providence, Warren & Bristol	Rufus Smith	J. Brightman	Bristol, R. I.

* Mechanical Superintendent. † Superintendent of Motive Power and Machinery.

Railroad.	*Master Mechanic.*	*Master Car-Builder.*	*Residence.*
Portsmouth, Gt. Falls & Monmouth	James Tucker	E. Fall	Union Village, N.H.
Petersburg	R. B. Adams	Alex. Wright	Petersburg, Va.
Providence & Worcester	Joseph Kelly	Olney L. Smith	Providence, R. I.
Peninsular R. R.	T. G. Templeton		Battle Creek, Mich.

R

Raleigh & Gaston	J. B. Gayle	J. B. Gayle	Raleigh, N. C.
Rensselaer & Saratoga	W. B. Gage		Troy, N. Y.
Richmond, Fredericksburg & Potomac	H. Kuhn	W. H. Trainham	Richmond, Va.
Richmond Danville & Piedmont	John McFarland	H. Longest	Richmond, Va.
Richmond & Petersburg	John O'Brien	J. J. Martin	Richmond, Va.
Richmond & York River			Richmond, Va.
Rome, Watertown & Ogdensburg	Wm. Jackson	H. H. Sessions	Rome, N. Y.
Reading & Columbia	B. Van Lew		Columbia, Pa.
Rome, Georgia	O. W. Harbin	O. W. Harbin	Rome, Ga.
Rochester & Genesee Valley	M. E. Brown	M. Wilder	Buffalo, N. Y.
Rockford, Rock Island & St. Louis	R. D. Grant		Beardstown, Ill.
Rock Island & Peoria			Rock Island, Ill.
Rutland	N. L. Davis	M. M. Crooker	Rutland, Vt.

S

San Francisco & San José	R. B. Bishop	Frank Bellisle	San Francisco, Cal.
St. Croix & Lake Superior			New-York City.
St. Lawrence & Ottawa	Calvin Dame	Calvin Dame	Prescott, Canada.
St. Paul & Pacific	C. N. Parker, Jr	C. N. Parker, Jr.	St. Paul, Minn.
St. Louis & Iron Mountain	O. A. Haines	Oscar Doolittle	Carondelet, Mo.
Sandusky, Mans. & Newark		Charles Scoeby	Sandusky, Ohio.
St. Joseph Valley			Kalamazoo, Mich.
San Antonio & Mexican Gulf	W. T. Bingham		Victoria, Texas.
South Side of Long Island			New-York.
St. Paul & Sioux City	Jas. G. Butterfield		Shakopee, Minn.
St. Louis, Vandalia, T. Haute & Ind	C. R. Peddle	H. Kermise	Terre Haute, Ind.
South-Carolina	W. B. Smith	John Reed	Charleston, S. C.
South-Side of Virginia	J. T. Robinett	J. T. Robinett	Petersburg, Va.
South & North-Alabama	Tho. Jeffries	Tho. Jeffries	Lime Station, Ala.
Southern Central	C. G. Brown		Auburn, N. Y.
Southern Minnesota	Wm. Lininger		Hokah, Minn.
Southern of Canada	Albert Congdon	Albert Congdon	Fort Erie.
South-Western of Georgia	C. D. Wall.		Columbus, Ga.
South-Western of Georgia	D. M.Gogul	James A. Knight	Macon, Ga.
South Shore	Warren E. Ray		Cohasset, Mass.
Stanstead, Shefford & Chambly	W. H. Smith	M. Sessions	Waterloo, C. E.
Schuylkill & Susquehanna	John E. Wootten	John E. Wootten	Reading, Pa.
Seaboard & Roanoke	J. B. Pendleton	J. B. Pendleton	Portsmouth, Va.
Stonington & Providence	J. H. Anderson	J. H. Anderson	Providence, R. I.
Selma & Gulf	Wm. T. Daughtrey		Selma, Ala.
Selma, Rome & Dalton	A. G. Maynes	W. W. Peirce	Selma, Ala.
Sioux City & Pacific	Charles Foster	J. R. Dow	Missouri Val., Iowa.
Spartanburg & Union	J. N. Benner	Jacob Rice	Union C. H., S. C.
Sheboygan & Fond du Lac	J. H. Erwin	J. H. Erwin	Sheboygan, Wis.
Sullivan & Erie			Tonawanda, Pa.
Syracuse & Binghamton, N. Y.	B. G. Merrill.	B. G. Merrill.	Syracuse, N. Y.
Sycamore & Cortland			Sycamore, Ill.
St. Louis & South-Eastern	C. B. Salisbury		Mt. Vernon, Ill.

T

Taunton Branch.			Taunton, Mass.
Tioga	Peres Bonny	D. H. Stratton	Blossburg, Pa
Texas & New-Orleans	R. B. Baer		Houston, Texas.
Tennessee & Pacific	William McKeand.	William McKeand.	Nashville, Tenn.
Toledo, Wabash & Western	W. F. Ray		Fort Wayne, Ind.
Toledo, Wabash & Western		David Hoit	Toledo. Ohio.
	T. G. Gorman		Springfield, Ohio.
Toledo, Peoria & Warsaw	A. H. De Clerq	R. M. Hemphill	Peoria, Ill.
Troy & Bennington			Troy, N. Y.
Troy & Boston	Foster Church	R. V. Coon	Troy, N. Y.
Toronto	Grey & Bruce		Toronto, Can.

U

Union Pacific	I. H. Congdon	Geo. E. Stevens	Omaha, Nebraska.
Utica & Black River	John Bailey.	David James	Utica, N. Y.
Utica, Chenango & Susquehanna	C. H. Brown		Utica, N. Y.

V

Virginia & Tennessee	F. Sterk	W. A. Morgan	Lynchburg, Va.
Vicksburg & Meridian	Jas. B. Brown		Vicksburg, Miss.
Vineland			Vineland, N. J.
Vermont Central	J. M. Foss	Milton Sessions	St. Albans, Vt.
Vermont & Massachusetts	D. T. Davis	Jacob Marsh	Fitchburg, Mass.
Vermont Valley			Rutland, Vt.

W

Washington, Alex. & Georgetown			Washington, D C.
Warwick Valley			Warwick, N. Y.
Wicomico & Pocomoke			Berlin, Md.
Wilmington, Charlotte & Rutherford	W. A. Gill	Thomas Myers	Laurenburg, N. C.
Wilmington, Columbia & Augusta	George Hall	W. J. Calais	Wilmington, N. C.
Winchester & Potomac			Winchester, Va.
Westchester & Philadelphia	John Moyer	N. Pawling	Philadelphia, Pa.
Wilmington & Weldon	John Bissit	John Bissit	Wilmington, N. C.
West-Jersey	W. McAllister	C. C. Williams	Camden, N. J.
Western Maryland	R. V. Dohoney	J. H. Nussear	Union Bridge, Md.
Winona & St. Peter	F. C. Ford	H. L. Preston	Winona, Minn
Western North-Carolina	E. H. Marsh	E. H. Marsh	Salisbury, N. C.
Western R. R. N. C	M. W. Atkinson	M. W. Atkinson	Fayetteville, N. C.
West-Feliciana	R. C. Brower		Woodville, Miss.
Whitehall & Plattsburg			Plattsburg, N Y.
Western & Atlantic	John H. Flynn	John Sherman	Atlanta, Ga.
Worcester & Nashua	George H Griggs.	George H. Griggs.	Worcester, Mass.
Welland	William Wells	William Pay	St Catharine, C. W.
Washington & Ohio	Nathaniel Hayes	Joshua Hamson	Alexandria, Va.

THE Pennsylvania Railroad Company use on the main line, between that city and Pittsburg, 482 engines, 693 passenger-cars, 6632 freight-cars, 731 coal-cars, 96 baggage, mail, and express-cars. These are the property of the Pennsylvania Company. In addition to these, there are now on the road 4877 eight-wheeled cars not owned by the company. The road crosses 150 iron bridges, the total length of which is 13,960 feet; thirty-nine wooden bridges, with a total length of 8977 feet, and seventeen stone bridges of 24-feet span and upward. It penetrates 8 tuennls, the shortest one being 200 feet, and the longest 3612 feet.

AT the light locomotive-works of Messrs. Smith & Dawson, at Connellsville, Pa., can be seen all kinds of engines, from the largest to the smallest; but the greatest novelty to the visitor is the narrow-gauge locomotives now being constructed for various parts of the globe. Mr. Smith was the senior partner of the firm of Smith & Porter, of Pittsburg, (now dissolved,) and is regarded as the pioneer of the narrow gauge. Their buildings are brick, and admirably adapted to the purposes for which they are used. The main building is 240 by 50 feet, three stories in height, with a wing 75 by 40, and two out-buildings, 60 feet square, with other attachments. They now employ over one hundred men, and intend to increase the force several hundred. Orders are crowding them, which compel their employees to make extra time in order to meet contracts.

THE

WILLIAM BUTCHER STEEL WORKS,

OF PHILADELPHIA, Pa.

SAMUEL HUSTON, Pres.
WM. BUTCHER, Gen. Sup't.
H. P. RUTTER, Sec. and Treas.

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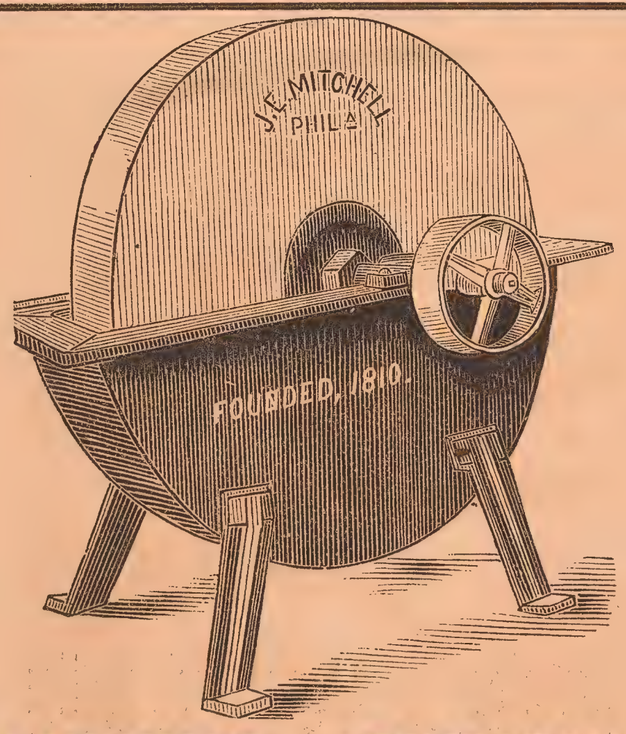

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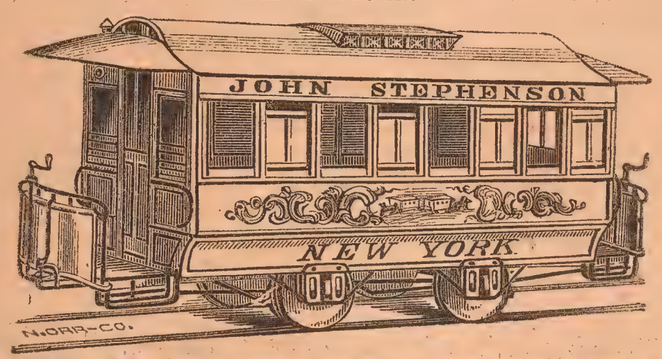

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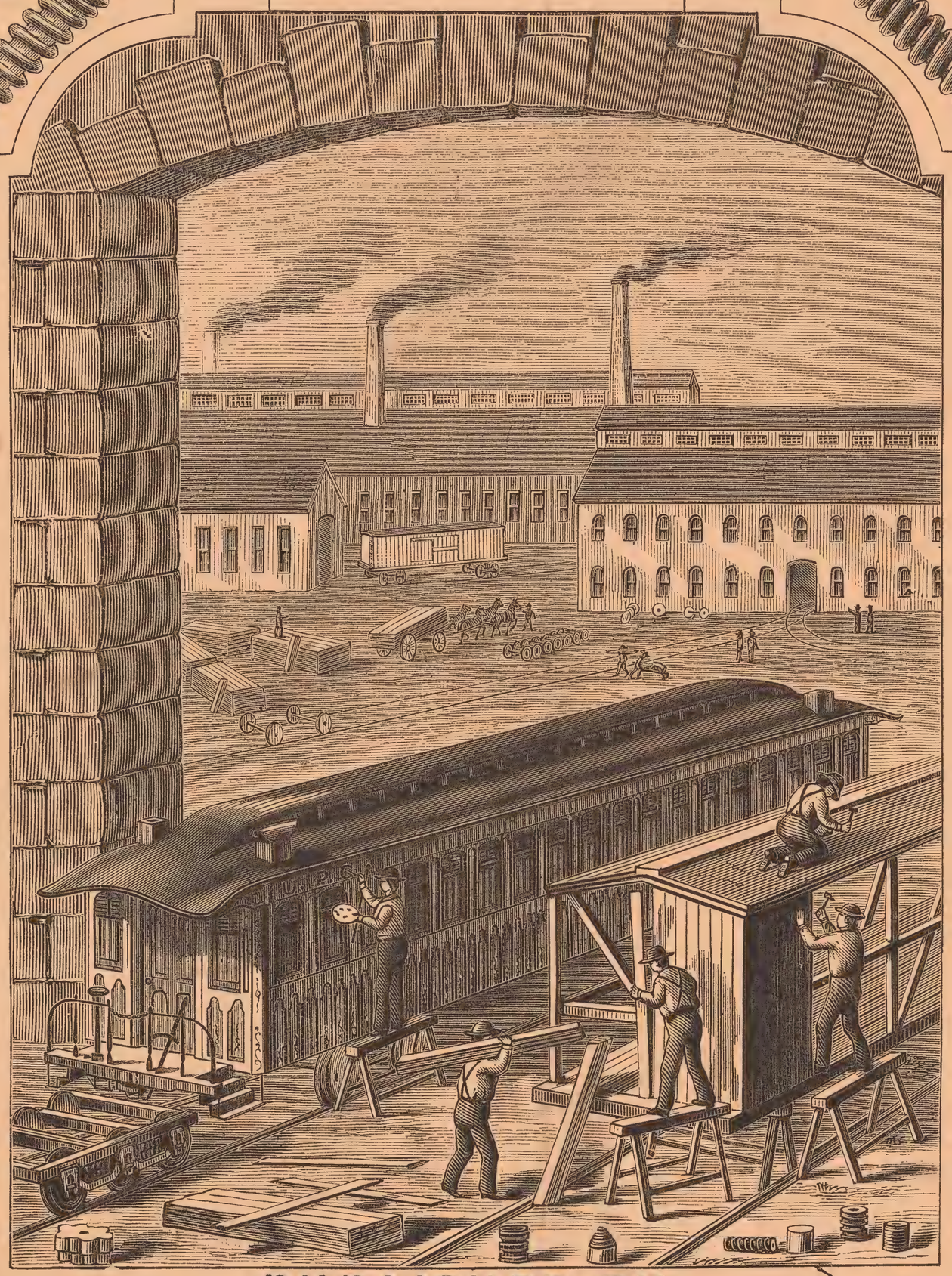

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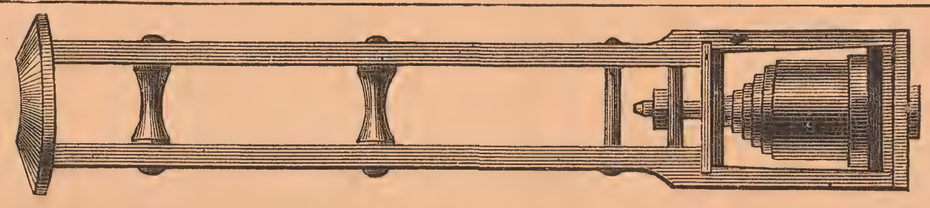

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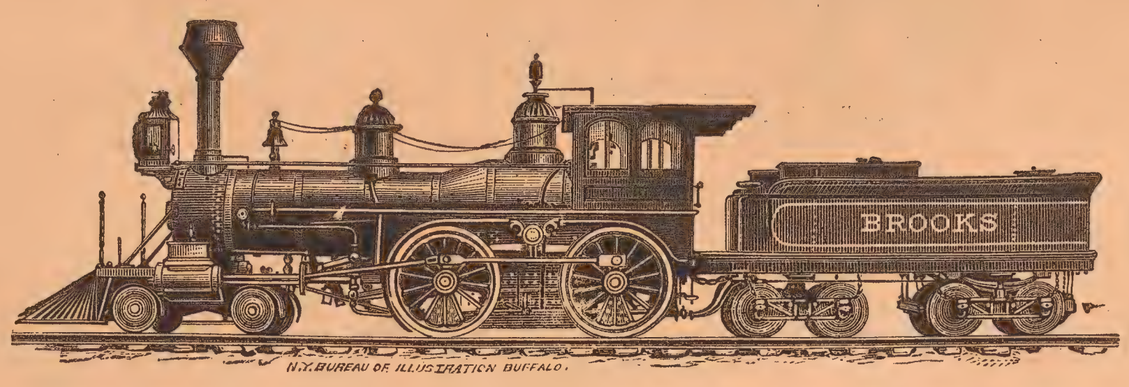

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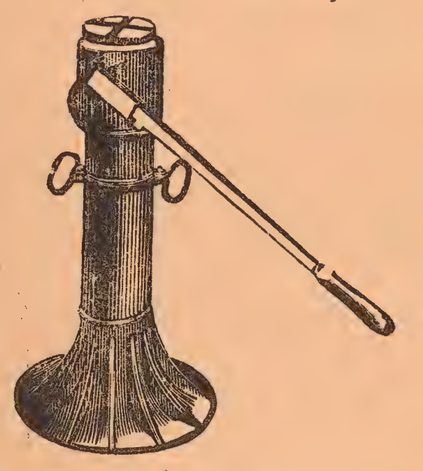

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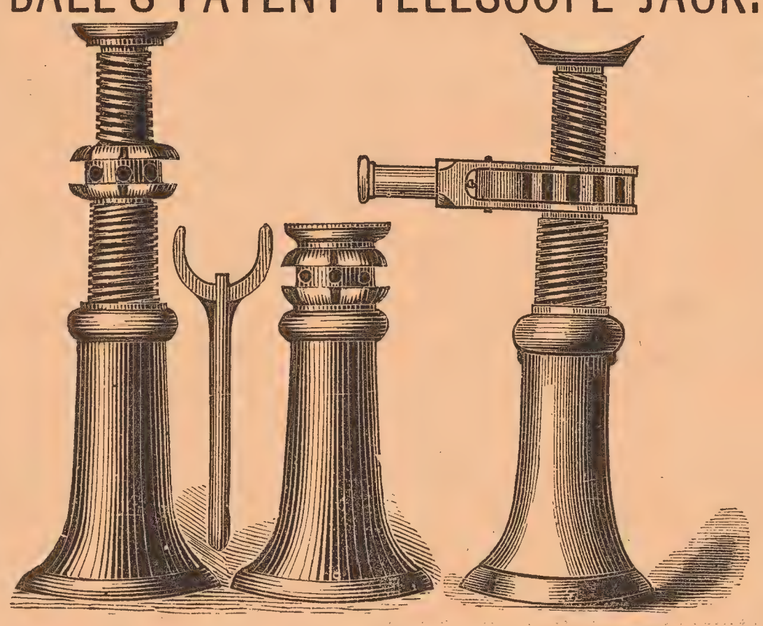

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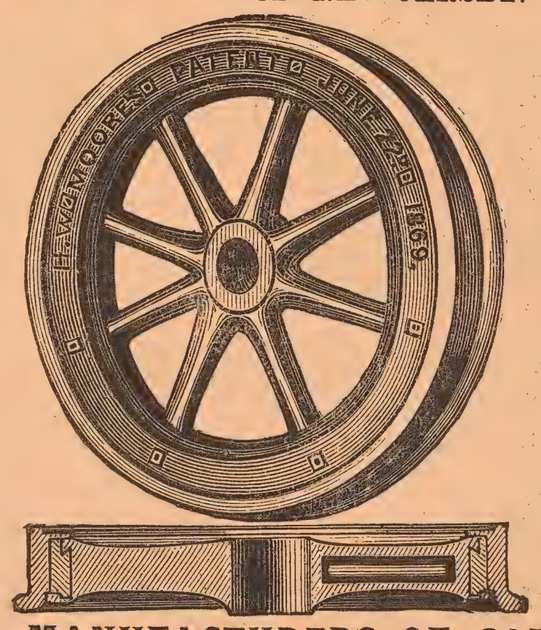

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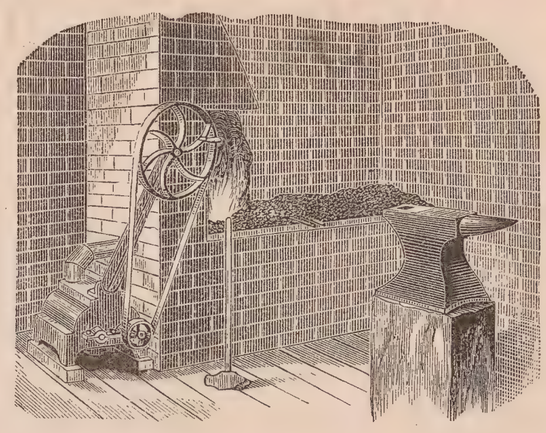

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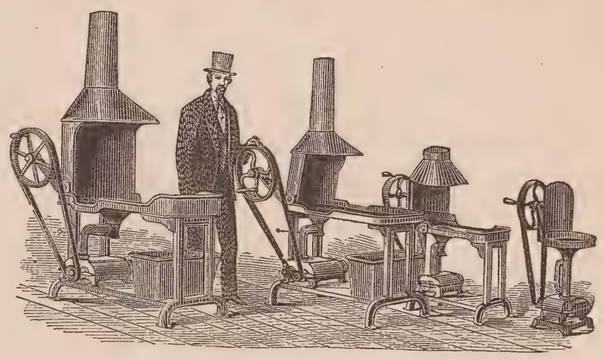

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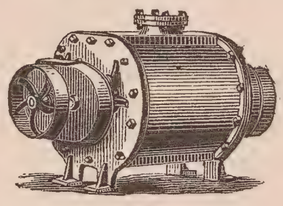
The Forge is compact, durable, reliable, convenient, easily moved, and yet has great heating capacity, as the blast is furnished by our Blower, making it in fact the best Portable Forge in existence.

P. H. & F. M. ROOTS ALSO MANUFACTURE

PATENT FORCE-BLAST ROTARY BLOWERS

OF ALL  SIZES,

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The Hudson Railroad Co., Indianapolis and Cincinnati Railroad Co., Hanover Branch Railroad Co., Albany and Susquehanna Railroad Co., and Chicago, Burlington and Quincy Railroad Co. have them in use.

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PATENT

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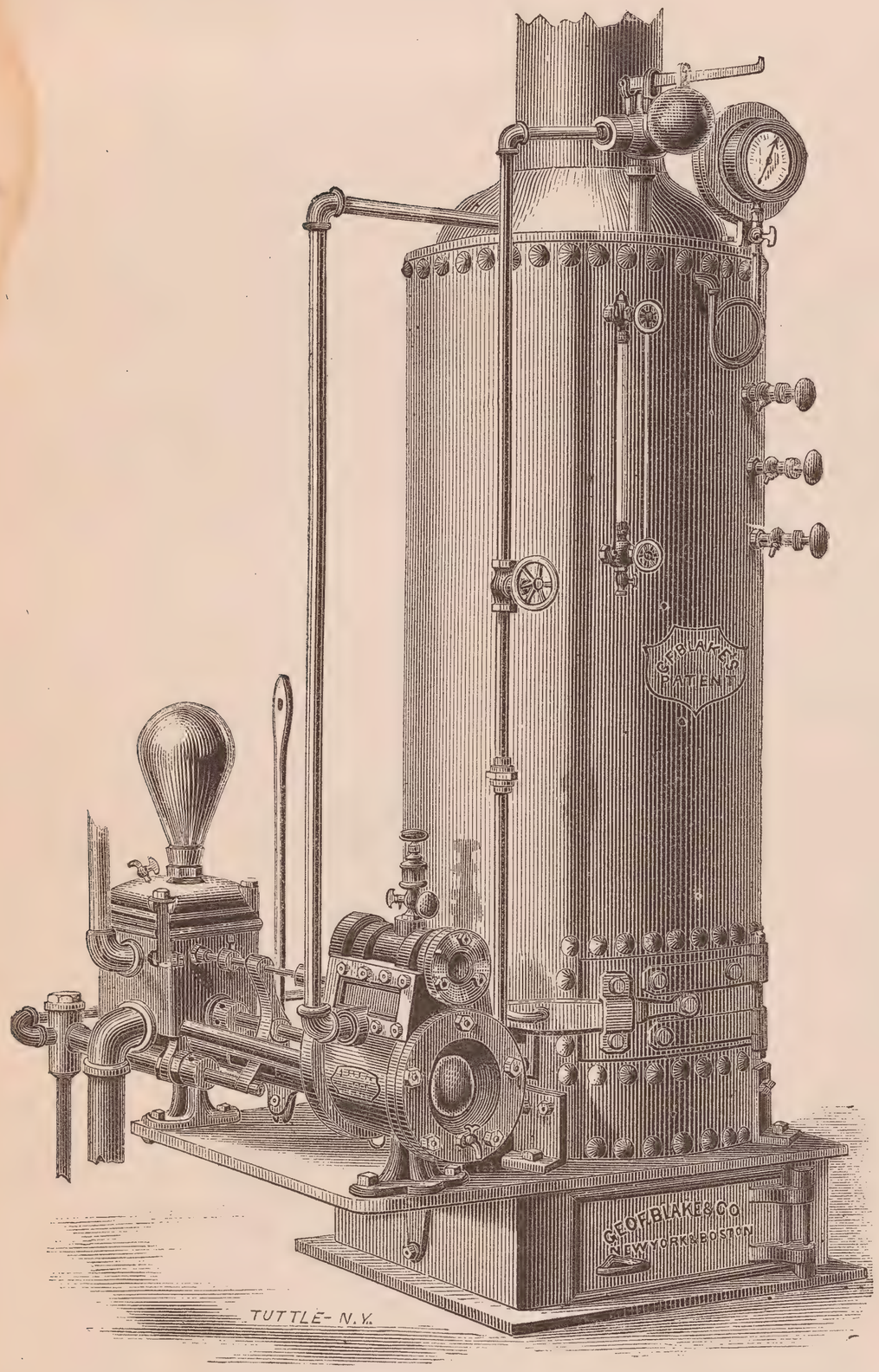
WITH FIXTURES COMPLETE, (ready for use.)



[Cut represents TANK PUMP, size "B," with Boiler-feed and *Hand-power* attachments.]

FOR

RAILROAD STATIONS, HOTELS, RESIDENCES, ETC.

ALSO, FOR

FACTORIES, BRICK-YARDS, BREWERIES, TANNERIES,

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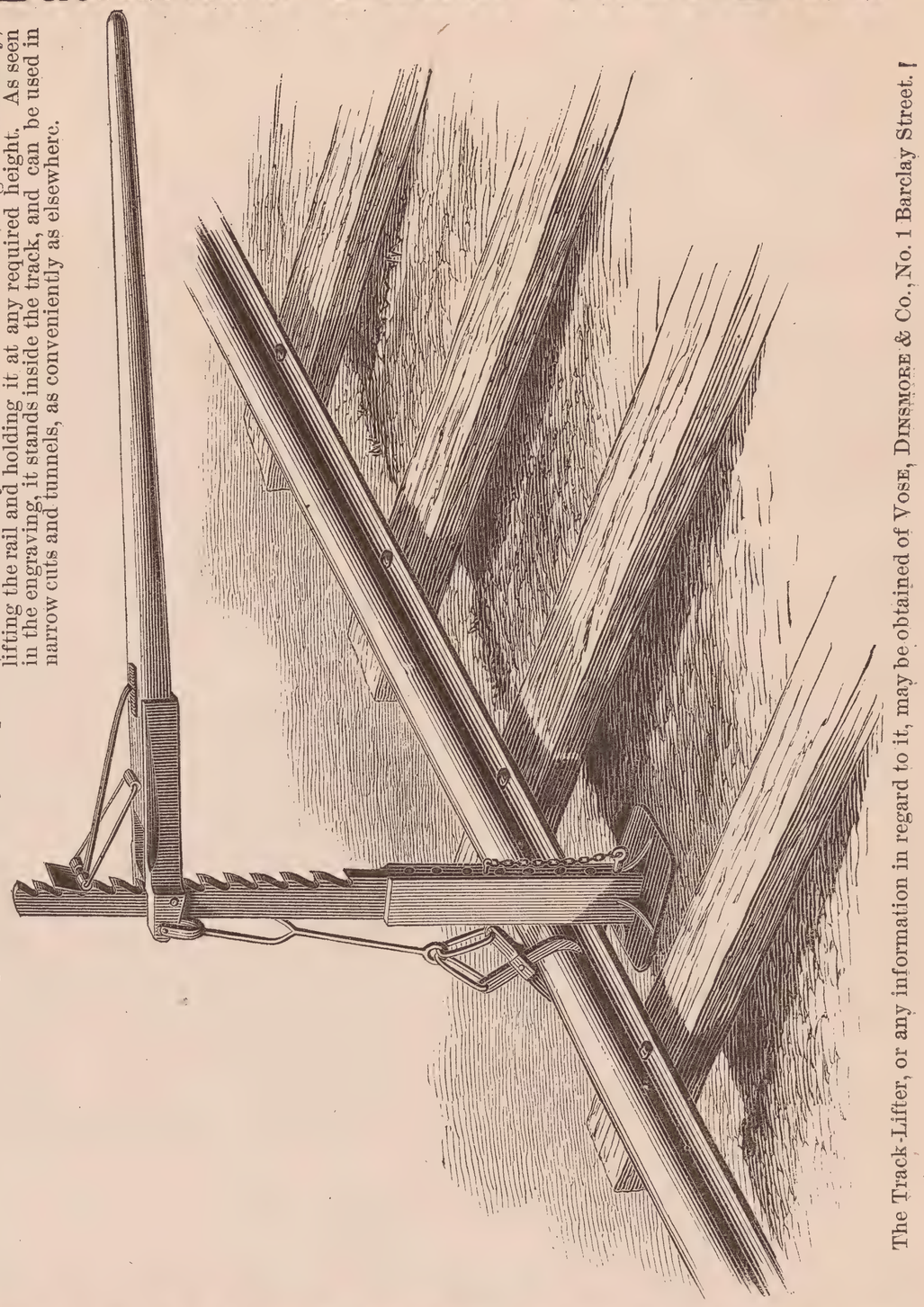
PUBLIC OR PRIVATE INSTITUTIONS.

COMPLETE, with Boiler, Boiler Base, Smoke Bonnet, Grate Bars, Boiler-feed Attachment, Gauge Cocks, Steam Gauge, Water Gauge, Safety Valves, Globe Valves, Blow-off Cock, Steam and Exhaust Pipe; also, Boiler-feed-connection, Valves, Unions and necessary Fittings.

GEO. F. BLAKE & CO.,

79 Liberty Street, New-York.

Batchelor's Patent Track-Lifter.



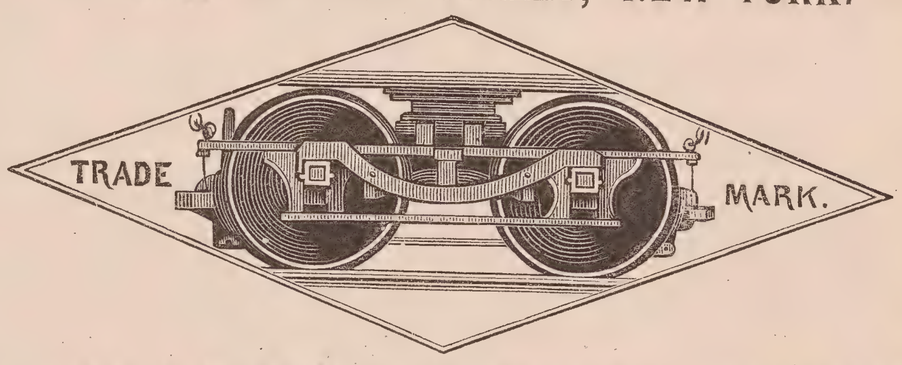
THE engraving herewith presented conveys a very clear idea of the working of Batchelor's Patent Track-Lifter. The device is a decided improvement upon the various methods now in use for raising the track, including both rail and ties, for the purpose of ballasting or repairs. It is easily transported, and can be adjusted and worked with the greatest facility, lifting the rail and holding it at any required height. As seen in the engraving, it stands inside the track, and can be used in narrow cuts and tunnels, as conveniently as elsewhere.

The Track-Lifter, or any information in regard to it, may be obtained of VOSE, DINSMORE & Co., No. 1 Barclay Street.

ISAAC U. COLES & CO.,

19 NEW CHURCH STREET, NEW-YORK.

Tallow Lubricator.



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The Packing dispenses with the use of Oil and Waste, and prevents all heating of journals, requires less time and attention than any other now manufactured, and causes a saving of at least twenty-five per cent.

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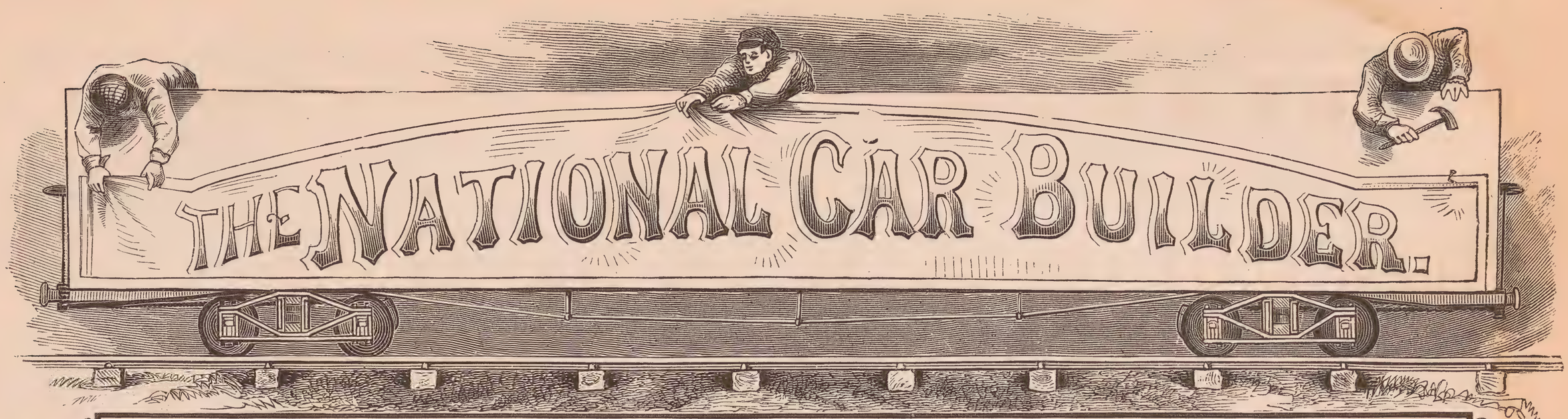


DEVOTED TO THE INTERESTS OF RAILWAY ROLLING STOCK.

Vol. II.
No. 11.

MAY, 1872.

50 Cents per Annum.
Single Copies, 10 Cents.

Egyptian and Grecian Art.

ANCIENT Egypt was undoubtedly the birthplace of the arts and sciences, and perhaps no nation since has ever surpassed the Egyptians in the imitative and ornamental arts; a proof, if proof were needed, that nature is the best model. They copied the lotus, the palm, the papyrus, the bulrush, and the vine, with an accuracy that can not be surpassed by modern skill. They colored glass in such a way as to be mistaken for the amethyst and other precious stones, and when their chairs, tables, and sofas were made of common wood, they were painted with the happiest effect in imitation of foreign varieties, the various knots and grains being depicted in precisely the same way as practiced in the present day. The coffins in which they placed their dead (many of which inclosing mummies are still in existence) were richly carved and profusely ornamented. They were a domestic people, and like all such they were extremely attentive to the decoration of their homes. Their furniture was rich in color and graceful in form; the chairs and couches about the same height, and of somewhat similar shape to those of our time; the legs were formed in imitation of the legs and feet of animals; the backs of the chairs were concave, and in some large fanteuils carved lions formed the arms; the cushions were of colored cotton or painted leather; the framework was sometimes inlaid with ivory or rare woods; and the walls and ceilings of their apartments were richly painted and of great beauty.

The characteristics of Grecian ornament are elegance and simplicity. The Grecians had the advantage of studying Egyptian art. Their ornamental designs, whether in dress or furniture, whether in public or private buildings, were characterized, as was said previously, by the greatest elegance and simplicity. In the nineteenth century, with all our boasted civilization, when we desire to design any pure, chaste, and exquisite ornament, we are glad to have recourse to Grecian models, which seem to attain to our idea of perfection. We are told that their dwelling-houses were furnished in a plain and unostentatious manner, but however homely the materials, the shapes into which they were fashioned were singularly elegant and graceful. In their sculptures and carving they imitated the acanthus, the honeysuckle, the holly, and many other plants, leaves, and flowers. The following account, by Vitruvius, of the origin of the Corinthian capital shows how its designer took nature for his model: "A young maiden of Corinth having died, her nurse collected in a basket the trinkets which had pleased her when alive, placed them over her grave, and covered the whole with a tile. The basket happened to be placed over the roots of an acanthus plant, the leaves and shoots of which grew up round the basket, and curled round the angles of the tile. This interesting combination attracted the attention of Calimachus, the architect, who from thence designed the beautiful capital of the Corinthian column."—*The Cabinet-Maker.*

Grand Trunk Railway.

THE Montreal *Gazette*, in speaking of the growth of railway traffic in Canada, thus refers to the rolling-stock of this road, which has recently been greatly improved:

"Twenty-two new first-class passenger-cars of the most improved construction have been added to the stock during the last two years, and the old stock is being rapidly renovated and modernized. Seventeen more of the very best cars that can be built are under construction, and will be completed this year, besides a considerable addition of improved second-class and baggage-cars. Twenty Pullman cars are now completed, and four more will be ready for use before the first of June.

"The stock of engines has also been largely added to, and its conditions very greatly improved. Last year 20 additional new engines were ordered, and this year orders have been given for 30 more, all of which will be delivered by 1st December at the latest.

"The freight-cars have also been largely added to. During the last three years nearly a thousand change-able-gauge cars for the through traffic have been placed upon the line. In addition to this, 500 box-cars were supplied in 1870; 300 box and 200 platform-cars in 1871; and orders are now being given for 500 more cars, to be delivered during the present year. This will make a total addition in about three years of 2,500 cars to the freight-carrying capacity of the line. The old cars are also being thoroughly overhauled, and there are new ones being built every year to keep the stock in good order, both as regards numbers and efficiency. It is this which has enabled the company to transport nearly 450,000 tons more of the produce of the country during 1871 than it did in 1867, the figures being 1,016,874 tons in 1867, and 1,455,323 tons in 1871."

Baltimore and Ohio Railroad.

WE extract the following from the annual report of this company:

"The new rolling-mill at Cumberland was completed during 1870; and the manufacture of rails was commenced in January, 1871, from which date up to September, in the same year, upward of 12,000 tons of rails were manufactured and supplied to the road department. The cost of this mill and machinery amounted to $547,968.86; but the company has the satisfaction of knowing that the quality of the rails, from the careful selection of material and the adoption of the best system of manufacture, has hitherto proven to be superior to that of rails previously obtained from other manufacturers; and it is estimated that the improved quality and increased durability of the rails, as conducing to greater economy in the maintenance of way, will fully justify the expenses which have been incurred. It may be noted, in this connection, that, from proximity to inexhaustible supplies of coal, Cumberland is peculiarly appropriate for the location of a rolling-mill, in which abundant supply and cheap transportation are great *desiderata*.

"In submitting his report, the master of machinery (Mr. John C. Davis) states that the extension of connections, and the expansion of traffic upon the various routes, have again required a material increase of equipment. The number of locomotives now in use on the main stem and branches is 335, of which eleven were rebuilt and forty thoroughly repaired during the year. Ten new ten-wheel freight-locomotives were also built at the company's shops, Mount Clare, and furnished to the Pittsburg and Connellsville Railroad. The car equipment has been increased by the construction of eight hundred and forty-three (843) additional cars, the greater number of which have been placed on the through lines, known respectively under the titles of 'Commercial,' 'Globe,' and 'Continental.' Two hundred iron cars have been built, in a durable manner, to supply the increasing demand for coal; and eleven passenger, six baggage, one officers', and six Pullman palace drawing-room and sleeping-cars have been constructed for the main line, and one baggage and one compartment-car for the Washington and New-York line. These cars have been built in the best manner, and are equipped with all the modern conveniences of travel. Mr. Davis alludes, in his report, to the advantages derived from the well-organized combination of the rolling-mill at Cumberland; the iron and brass founderies, forges, saw-mills, etc, at Mount Clare; the foundery at Grafton, and the extensive equipment of stationary machinery at all points; and claims that the interests of the company have been materially advanced by the creation of such efficient and harmonious working arrangements."

Iron Freight-Cars.

THE merchants of St. Louis are just now much interested in a model of an iron freight-car, now on exhibition at the Produce Exchange in that city. This car, which is said to meet with much favor, is cylindrical in shape, giving, it is claimed, greater strength without the least decrease in carrying capacity; the pressure against the sides, which, in the square cars, can only be obviated by great care in loading, tending, in the case of the cylindrical iron car, only to equalize the distribution of weight upon the floor. The form also admits of perfect ventilation, as the false floor necessarily gives an air-chamber beneath, while the formation of the sides by double casing extends this air-chamber on all sides throughout the length of the car. In the model, a simple arrangement is shown by slides and perforations of the false or interior bottom and sides, whereby a constant current of air could be maintained through grain or other freight while the car is in motion. The most important feature, however, is the use of iron in construction in place of wood. This not only secures absolute immunity from fire—a feature which will tend to greatly lessen the cost of carrying cotton and other inflammable freights—but,

while increasing the strength of the car some fifteen per cent, and rendering damage to such freight as flour impossible from broken timbers, etc., reduces the weight of the car one ton; in other words, enabling an engine capable of hauling twenty loaded wooden cars of the present form to haul twenty-two with the same expenditure of power, and wear and tear to the road-bed and superstructure. This would result in a saving of at least ten per cent upon freight traffic—a consideration too important to be overlooked by practical railroad men. The interest manifested in this model by the merchants of St. Louis is an indication of the gradual growth of a popular sentiment in favor of the substitution of iron for wood as a material for cars. The change is one which is sure to come sooner or later; and while we do not look for a rapid movement in this direction, owing to the difficulty and expense of changing the car-manufactories of our principal railroads into works for the manufacture of iron cars, the necessity for economy in traction, by a reduction in the proportion of dead weight now hauled, will eventually compel the use of iron cars for both passengers and freight.—*Exchange.*

Stock-Cars.

IMPROVED stock-cars appear to be ignored, or practically forbidden, by an act reported in the House of Representatives by the Committee on Agriculture, and passed in that branch of Congress. It provides cattle transported by rail shall not be confined more than 28 consecutive hours in cars, and that between such periods there shall be intervals of at least five hours for rest, food, and water. There are two or three inventions which are intended to obviate altogether the necessity for taking cattle from cars either for rest or food, they being planned so that the animals may lie down in their cars, being separated from each other, and provision being made for feeding and watering them on the way. Cars on one of these plans have run through from St. Louis to New-York without unloading the cattle, and it is claimed that they were in much better condition than is usual when they reached New-York. The terms of the law would seem to impose conditions on the traffic which will render the use of such improved cars, however perfect they may be made, unprofitable; the pecuniary advantage sought by them being the reduction of the time of the trip and the keeping of the animals in good order.—*Railroad Gazette.*

Safety-Stoves for Car-Heating.

MR. E. M. GRANT, of Tuskegee, Alabama, thus replies to a correspondent of the *Railroad Gazette* who had made the assertion that "no car is safe with a stove in it:"

"The stoves patented in 1868 by E. M. Grant & Co. are a perfect safeguard against accidents by fire when cars are thrown from the track; they burn either wood or coal, and cost but a few dollars more than the ordinary first-class car-stove. They have been thoroughly tested on some of the principal railroads in this country, and pronounced unsurpassed for heating facilities and economy of fuel. They are constructed with a tank of water underneath the fire-chamber, with the bed of the said chamber four inches above the level of the water-tank. The tank is provided with a perforated cover, and this cover and the space of four inches prevents any splashing of the water against the bed-plate of the fire-chamber. The bed-plate is perforated with three-inch holes, covered by valves of cast-iron, fitting into the bed-plate, (something like an ordinary stove-cover.) These valves are held in position by their own weight while the car is upright; but the moment the car falls over, the covers fall out, and the water deluges the fire-chamber, and the fire is extinguished before the car reaches the ground.

"The stovepipe-hole is covered by a swinging plate suspended several inches beneath the top of the stove. This plate falls over the aperture when the car is upset, and effectually prevents the escape of coals, and also retains the water in the fire-chamber. The tank holds about twenty-five gallons. These stoves are constructed as follows: The tanks are of galvanized boiler-iron; the stove body proper is fastened to the tank in the most secure manner; the bed-plates of the fire-chambers are of cast-iron, ribbed on the under side to prevent 'sagging.' The stove body is encased in a Russia-iron jacket, held off from the body by ribs, thus forming an air-chamber between the jacket and the body of about one and one half inches thick. This effectually prevents the burning of any one thrown against the stove by an accident to the car. The stoves being constructed of wrought-iron, there is no danger of breaking, the fire can not escape from the stove, and the fire is extinguished the moment the car falls half-way over, and before it reaches the ground. The stove door is fastened with a set-screw, which prevents it flying open."

An Elegant Passenger Equipment.

A CHICAGO paper mentions that a day-express train of the Michigan Central Railroad recently left that city with some of the finest coaches ever seen in America. The baggage-car is a new one, made expressly for this train and the through business between Chicago and Niagara Falls. It is high, well lighted, and provided with the standard twelve-wheel trucks invented by Sutherland, their car-builder. The smoking-car is one of the regular Michigan Central twelve-wheel coaches, fitted up elegantly with all the comforts and conveniences which delight the lovers of the "weed." Then come two magnificent coaches of the Central build, that surpass any thing ever before gotten out by them, and which can not be excelled on this continent. They differ from the cars heretofore built in having the panels run up and down the body of the car, instead of lengthwise, and in having large windows of a single light of plate-glass each. Following these is a through or ladies' car, which is one of the finest coaches of the pattern previously used, and is elegantly and tastefully furnished throughout—velvet carpets, plate-glass windows, etc. The train had also attached an elegant Pullman drawing-room sleeping-car, which goes through to Rochester without change. This train is fully equipped with the Westinghouse air-brake, the Miller platform and buffers, and is thoroughly ventilated with the Ruttan system of ventilation. One of these trains will leave Chicago and Detroit every morning, and those who have to travel have here every thing that will make them comfortable.

The Detroit end of the line responds as follows, in the columns of the *Free Press:* "One of the handsomest trains ever put upon a railway left the city on the Michigan Central road Saturday morning, for Chicago. The train was composed of six cars—a baggage and five coaches, and each one was on the track for the first time. The baggage and mail-car is considered to be one of the handsomest and most convenient ever put upon the road, and the coaches are elegant. The interior of each is a perfect parlor, and the artists spared no pains to make the exterior as handsome as paint and gold-leaf can make a thing. Each car is provided with the patent platforms and buffers, the popular air-brake, and the newest and best ventilating apparatus, guaranteeing passengers safety, comfort, and easy riding. All the cars were constructed at the company's shops, and the news that the new train was to go out attracted scores of citizens to the depot. Other new cars of similar make are soon to be added, and the Central will this summer be more popular than ever."

Brilliant Presentation Party.

MR. BENJAMIN W. HEALEY, Superintendent of the Rhode Island Locomotive-Works, recently gave a large and brilliant presentation party at his residence in Providence, in honor of his being formally presented with the beautiful silver model of the locomotive "Roger Williams," made by Mr. J. D. Benton, by order of the railroad men of New-England, for a present to Mr. Healey. The beautiful silver model of the locomotive, with its musical attachment, was placed on a table in the parlor, and played sweet airs while the company were arriving.

When the company were assembled in the parlor, Mr. Henry A. Chace, Superintendent of Transportation of the Boston and Providence Railroad, made the presentation in a brief but happy speech.

"LADIES AND GENTLEMEN: We are not surprised nowadays at surprises that do not surprise us. We all understand that the beautiful work of art before us was made to be given to Mr. Healey by his large circle of friends, as an appropriate and valuable keepsake and symbolic token of their esteem; and in the same spirit of love and friendship with which we now tender it to him, we hope he will accept and cherish it. After all, there is to be surprise in connection with it, for you will find that there is to be no set presentation speech. That is all I have to say."

Mr. Healey was called for to respond, but could not then be found, and Mr. B. F. Brigham, of the firm of Gay, Munson & Co., of Boston, spoke for Mr. Healey in his absence, and gave a very humorous speech of acceptance, with the silver locomotive for his text, using wheels, rails, and boiler as "high-pressure" metaphors for love, regard, and esteem.

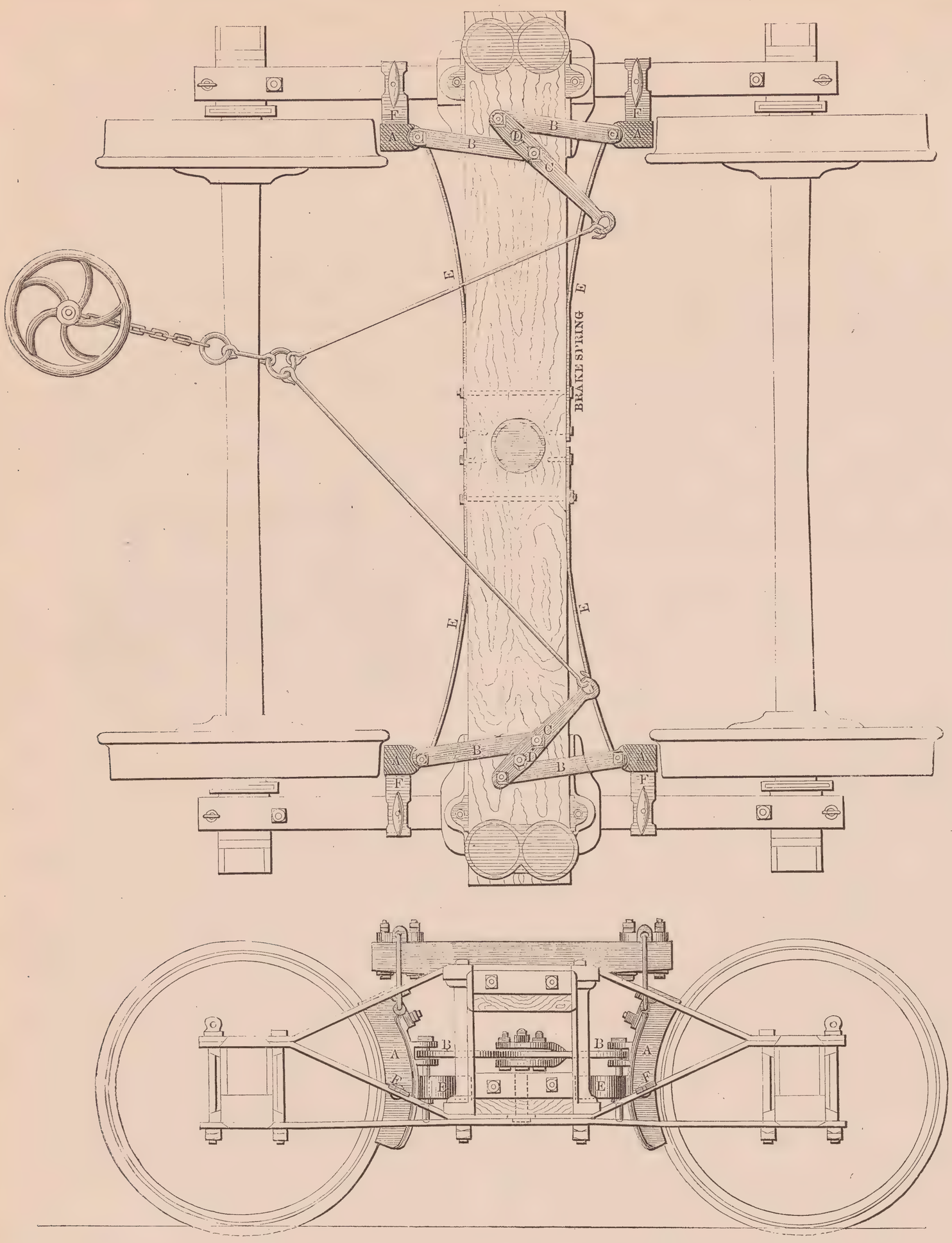
At the close of these presentation ceremonies, an hour was pleasantly occupied in the social dance, to the music of Gardner's Quadrille Band, after which an elegant entertainment was served in the dining-room, the tables being loaded with choice viands, and decorated with a great profusion of beautiful flowers.

About one hundred and fifty guests were present, including ladies and gentlemen. Among the latter were Earl P. Mason, President; William S. Slater, Director; William D. Hilton, Superintendent; Joseph Kelley, Master Mechanic, of the Providence and Worcester Railroad; A. A. Folsom, Superintendent of the Boston and Providence Railroad; James H. Anderson, Master Mechanic of Stonington Railroad; D. C. Tucker, Superintendent of Long Island Railroad; H. H. Poppenhusen, Treasurer of Flushing Railroad; A. B. Underhill, Master Mechanic; Benjamin Hobort, Station Agent, of Boston and Albany Railroad; J. D. Benton, maker of the model, and Mr. Elbers, of New-York.

East River Bridge.

WORK has been resumed on the Brooklyn pier, which is now 85 feet above high-water mark, and is to be carried up 189 feet further, of which it is intended to complete 100 feet the current year, and the remainder in 1873. The bottom of the caisson on the New-York side is 74½ feet below high-water mark, and 40 feet below the bed of the river. The excavation has been for 25 feet through sand and gravel, and 9 feet through quicksand, and is now in a combination of gravel and quicksand. Only a few feet remains to be excavated before the solid bed of clay and bowlders is reached on which the pier is to rest finally. It is intended to complete this pier to an elevation of 100 feet this year, and finish the remaining 174 feet in 1873. The sand has been excavated by means of compressed air, furnished by twelve steam-engines working as many pumps, each being disconnected from the others, so that in case of accident to any one the rest may not be affected. The sand is ejected from the pipes with astonishing force, and eats its way through the heavy iron elbows as though they were rotten wood. Occasionally an elbow gives way unexpectedly, and the sand and small stones shoot into the air to the height of 100 or 150 feet.

A EUROPEAN paper gives the following concerning a car said to be in actual use on some railroad on the continent: It is made to seat 84 passengers; 32 on an upper floor, on 8 seats; 50 on the lower floor, on 10 seats, and one seat for two in the upper tier, with places for the conductor and the brake. This car weighs 7600 kilogrammes, or 16,756 pounds, which is at the rate of 204 pounds per passenger.



A. Brake-head.
B. Connecting Links.
C. Lever.
D. Stud-bolt through Sand-sill.
E. Steel Springs.
F. Guide-stops.

Smith's Brake for Freight-Cars.

THIS brake, the application of which is very clearly illustrated in the engraving, is designed to meet a want which has long been felt by those engaged in operating railroads. A glance at its construction will disclose the fact that it dispenses with the brake-beam; and this is one of its most important features. To be rid of this expensive, troublesome, and dangerous appendage of the ordinary truck, is a great point gained, and it is effectually accomplished by this device. The saving in cost will be readily understood by all who are familiar with the working of the old method. The Smith brake has also other features to recommend it. It is simple in construction, and consequently cheaper and less liable to get out of order, and works a saving of a large percentage in the cost of repairing. It is attached to the truck itself instead of the car-body, as in the old style; can be easily and quickly applied, and exerts greater strength and power with less weight, checking the train uniformly and effectively, with a ready and sure withdrawal from the wheel when released. It has been in successful operation for the past two years; and during the past year has been running on more than 3000 cars, affording a practical test that it possesses all the elements of a first-class hand-brake, fully meeting the expectations of the inventor. Further information may be obtained by addressing E. B. Hill, Secretary of the Smith Patent Brake Company, Post-office box 839, New-York City.

THE new sleeping-coaches for the Erie Railway will probably be put on the road when the spring time-table takes effect. These cars will run to Chicago without change, notwithstanding the great difference in the gauges of the roads over which they are to run. Over the Erie road they will, of course, run on wheels of six-foot gauge. At Buffalo, the cars will run under a hoisting-machine, which will lift the cars from the broad-gauge trucks. Should this newest thing in railroading be successful, it will relieve the public from many annoyances from varying railroad-gauges, of which there are five (including the "narrow gauge") in the country. The attempt some years ago to make car-wheels movable on their axles, so as to accommodate different gauges, it was thought at the time would fill the requirement; but it has not been tried to any great extent on passenger-cars, but it has to some extent on freight-cars, the shifting being done by running the cars upon gradually converging or diverging tracks until the narrower or broader gauge is reached. Then the wheels are again locked.

Recent Patents.

CAR COUPLING.—Aaron K. Kline, of Readington, N. J. A double-headed coupling-rod is employed. The draw-heads have wide, large-mouthed openings for the coupling-bolt, the sides and bottom of which converge toward the rear to a point behind which are square shoulders for holding the head of the coupling-rod which drops behind them, a narrow space being provided between that portion of the side wall rising higher than the bottom wall for the shank of the connecting-bolt to fall into. The side walls are brought so close together in advance of this space as to cause the rod-head to rise without the aid of the bottom to pass over the shoulders to the space. In this space the shoulders are recessed where the head draws against them, so that, when the link is uncoupled at one end and let fall, the other head will be arrested by the upper wall of said recess so as to prevent the coupling-link from falling out. There is an overhanging projection on the end wall of the recess, under which a projection on the head of the rod is engaged, when it is adjusted for coupling. A coupling-rod, with a head on one end and a link on the other, may be used for coupling a draw-head of this kind with one of the other kind.

RAILROAD-CAR HEATER.—C. F. Pike, Providence, R. I. Aside from a novel arrangement of exhaust-pipes, pipes, heaters, registers, and ventilators, this invention consists in a peculiar method of warming and ventilating railroad-cars, consisting in passing steam through pipes in contact with a system of coils or pipes inclosed in air-flues, boxes, or chambers, so that the steam heats the liquid in said coils or pipes, and the liquid, by automatic circulation, heats the air so as to warm and ventilate the cars.

SIGNAL FOR RAILWAY CROSSINGS.—C. F. Pike, Providence, R. I. The gist of this invention is found in the combination of a series of keys inserted or arranged alongside of the rails, and connected by chains, wire ropes, or pneumatic tubes to operate a bell, or gong, or other device, to automatically and continuously sound an alarm when the train of cars passes over said keys; certain supplemental devices are also included in the claim.

CAR ROOF.—John L. Burnham, Nashville, Tenn. The invention consists in making a roof having arc-shaped and longitudinal undersheathing and cross pieces for outer cover, with intermediate longitudinal and continuous sheets of metal, which slightly overlap each other. It makes both a very cheap and durable car roof.

CAR COUPLING.—Henry Hawley, of Lynchburg, Va. The coupler is connected with the draw-head in any convenient manner. The coupling-link may be formed in any manner with spear-heads at the ends. Springs are attached to the opening plates, and an opening button is attached to an upright shaft. This shaft passes through the coupling and is supported by the bottom plates thereof and by the top plate. A cord pulley on the top of the coupling is fast on the shaft. To a pulley on another vertical shaft a cord or chain is attached. Its other end passes around the first-named pulley on the top of the coupling and is attached thereto. When the latter pulley is turned, the ends of the button are turned in contact with the opening plates, which throws the springs with the catch-plates from the shoulders of the spear-heads, and thus uncouples the cars. The cars are self-coupling as they come together, as the link requires no hand manipulation. A cord may extend from cranks under the coupling to the locomotive, so that the engineer may at any time release the locomotive from the cars.

Car-Shop Notes.

THE NEW-HAVEN CAR-SHOPS.

NEW-HAVEN is rapidly becoming a railroad centre, judging from the number of lines that meet here. Many of them are short ones, however, so that the amount of work done in the shops is small as compared with the number of roads. The shops of the Northampton road, and those of the New-York and New-Haven, are located here, and between them is divided most of the work required by the different roads. The New-Haven road, as it is familiarly called in New-York, has occupied its present shops a little more than two years. They are built upon newly made land near the main track, well away from the city; and not being limited as to space, are located to the best advantage, with spacious yards about them affording ample room They are one story in height, so that all the work can be done on the ground floor, an advantage which the occupants of shops in crowded cities can not fail to appreciate. The buildings are of brick, with wooden roofs supported by light iron trusses. The numerous sky-lights and large windows enable the men to work as many hours without artificial light as if they were employed out of doors. The line and counter-shafting is supported on a horizontal framing resting on tall cast-iron pillars.

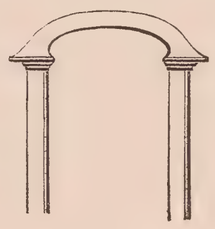
Mr. M. C. Andrews, the master car-builder, called our attention to one point of special value in the arrangement of the shops and location of the office. The office is so situated that from its windows can be seen the whole interior of the car-shop and cabinet-shop, the front entrances of the paint-shop, the transfer-table and its track, the door to the scrap-house, the lumber-house and yard, and the store-house. The entrance to the yard from the main track is directly in front of the office windows on one side. A great deal of valuable time is saved by this arrangement, both to overseer and workmen. The greater part of the work being thus directly under the eye of the master, any irregularity becomes apparent at once and receives his personal attention without delay. This is apparently a small matter, but is none the less deserving of attention. The shops are heated by steam-pipes, twelve deep, running along the walls; they are lighted with gas and supplied with water from the street-mains.

The passenger traffic of the New-Haven road constitutes a larger proportion of its whole business than is common on most other roads, especially during the summer. This causes a corresponding difference in the proportion of passenger and freight rolling stock maintained by the road. Mr. Andrews turns out regularly eight passenger-coaches a year, besides keeping in repair all others belonging to the company. As those in the service grow old-fashioned or unsuitable, they are put in good repair and sold, the policy of the road being to make all the rolling-stock first class. In many respects the standard passenger-coach resembles the light coaches of the Erie road, a description of which was published in the February number of THE CAR-BUILDER. The general method of framing, and the treatment of the roof, are quite similar. The average weight of a sixty-seat car, with one saloon and Blake heater, is 33,890 pounds. The sharp curves on the road, especially those in New-York City, render it absolutely necessary to provide for a much greater motion of the truck around its centre than is usually required. This consideration led to the adoption of roller side-bearings. The plate on the bolster is of cast-iron, and has to be prolonged on each side of the bolster some six inches, in order that the rollers may have a bearing on the sharp curves. That this bearing is successful, will doubtless surprise many of our readers. Its success is due, however, to a careful study of details. The axes of the rolls are a radial from the centre-plate, instead of being set square with the truck-frame, as is too often the case. They do not rest on their journals, except at the end of their travel, when they move up on to an incline and take a bearing on the journal. To carry out the principle perfectly, they should be made conical. Probably if they were made with a chilled tread, and the casting also, they would be better. On some roads three rolls on a side have been used. They have no doubt advantages, but are not generally employed on the Eastern roads. If a roller-bearing gets out of order, or is poorly made, it is much worse than an ordinary slide. Mr. Andrews does not use a king-bolt, but simply a 3½-inch centre-plate, setting in a well 8 inches deep. In the bottom of this well is placed a layer of old rubber spring chopped up and covered with a boiler-plate follower, upon which the centre-plate takes a bearing, the follower and rubber making a depth of about 5 inches. It is not expected, of course, that this small quantity of rubber will afford much play, but it interposes an elastic material between the truck and car-body which necessarily reduces the jar to some extent. The principle is to introduce as many cushioned joints as possible, in the form of elastic material, under the car. Some builders place a ½-inch strip of rubber on the top of the journal-box for the equalizing-bar to rest upon, every such device helping to destroy the jar, while the springs proper take up the motion. In the matter of springs, the same principle carried out gives twelve large rubbers in the bolster instead of six. They are simply separated in the centre and a spring-plank put in. Above these again another nest of very small rubbers divides and distributes the shocks, so that very little jar gets into the body.

Mr. Andrews's friction or shackle-link, although well known in the Eastern States, may be somewhat of a novelty to some of our readers. This little

sketch appended will give an idea of its construction. The upper bearing is a semi-circular cast-iron saddle, on which the link swings. This saddle is some eight inches or more in diameter, and there is naturally a great deal of friction in turning, which diminishes the speed of the movement and prevents sharp jerks. There is no pounding of the bolster against the frame, nor any of the quick lurches so common in the short links. This link is 2 feet 6 inches long. At the bottom, where the weld is made, the metal is usually left considerably thicker than elsewhere to make up for the wear. On some roads a small cast-iron shoe is put in under the lower bearing to prevent wear.

In the interior finishing of these cars, bronze is used in place of silver-plating. It costs about thirty-five per cent more than silver, but the improvement in effect fully compensates for the increased cost. The exterior is comparatively plain, though not too much so to conform to the requirements of good taste, especially as the rough usage the cars are subjected to in the streets of New-York does not justify much ornamental painting. The door-posts are finished a quarter round in the usual way, but the method of carrying this style of finishing over the door is a very tasteful and improved deviation from the ordinary

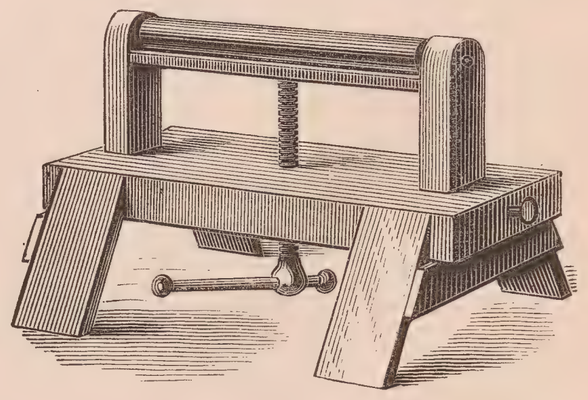


usage. The accompanying sketch will convey a hint of the way in which this is done.

The ventilators are of the exhaust pattern, made by swinging the windows in the monitor roof outward from edge. Handles at the ends of the cars open and close them automatically. Half of the windows only are open at a time; the other half, being every other one, open in an opposite direction, and when the train runs the other way. These windows, acting as deflectors, produce a strong outward current, so much so that in the first car to which Mr. Andrews applied them, the draught of the stove was reversed. They are now used with perforated ventilators in the letter-board or coving, which obviates all difficulty.

Close by the car-shops, and between them and the main track, is the round-house. It contains stalls for forty engines. Several of the stalls are used, however, for store-rooms, and one of them has been fitted up for an office and drawing-room by Mr. Kittendorf, the master mechanic. The house is a complete circle, and has the usual turn-table in the centre. The floor is of asphalt. The machine-shops are well arranged, and are fitted up with good machinery. All the repairing is done here, besides turning out a new engine from time to time, and rebuilding others.

The Northampton shops are systematic and well arranged, but they are small in size as compared with those of the New-Haven road. Many fine tools are noticeable, and also several little devices well adapted to facilitate the progress of the work carried on. One of these is a "horse," designed by Mr. John Sweeney, to be used with a boring-machine. Its top is, as usual, furnished with a roll for the timber to rest upon. It is made very low, and in the centre has a common carpenter's bench-screw for raising and lowering the upper part. Two small screws on each side pinch the upright legs and hold all fast at the proper height. An idea of its general form can be gathered from the diagram herewith presented. The fastening



screws are shown at the end of the horse proper. The whole device costs but a few hours' labor, and is just as good for the purpose it serves as any thing more elaborate and costly. In another article we intend to notice some points about the railroad machine-shops, and perhaps give some diagrams of sundry ingenious variations from general practice which attracted our attention.

The reader who is acquainted with the working of these shops will doubtless expect us to make some mention of the way in which the work is carried on, as well as some of the features of their general management. This we would be glad to do if our space permitted. But the truth is, that every thing is so orderly, systematic, and well arranged, and the business goes along so quietly and with so little apparent effort or outward sign, that the casual looker-on can hardly realize how it is all done. This fact is no small compliment to the completeness of the organization and the efficiency of the general management.

We take pleasure in acknowledging our obligations to Mr. Andrews, the master car-builder, Mr. Kittendorf, the master mechanic, and also to Mr. Sweeney and Mr. Sterns, for the courtesy extended to us in affording the facilities for obtaining the information we have endeavored to embody in this article for the benefit of our readers.

BOSTON AND ALBANY SHOPS AT SPRINGFIELD.

In the car department of the shops at this place there is a manifest want, not only of improved machinery, but of the necessary space required to perform the amount of work actually done. The shops are all old ones, containing no new machinery, and but a limited quantity of that which may be called old. This, of course, necessitates much superfluous labor in building and turning out rolling-stock, which might otherwise be dispensed with. When the present efficient and well-known master car-builder, Mr. F. D. Adams, first took charge of the shops a few years ago, the system which then prevailed in the matter of car-repairing hampered the works to a great extent, and compelled nearly the whole efforts of the master car-builder in the direction of repairs, to the exclusion of other work which equally required attention. General changes were soon made in the plans for the maintenance of the rolling-stock of the road, the result of which has relieved the shops to a considerable extent from the heavy amount of repairing, and enabled Mr. Adams to do much more than was formerly done in the way of

building new cars. All cars coming in for repairs are now thoroughly overhauled and put in good running order, so as to be safe for six months' or a year's service. Such as can not be economically put in this condition are torn down. This course relieves the shops of a great deal of petty repairing with which they have heretofore been burdened, and affords an opportunity to build new stock to take the place of that which has been condemned.

The force now employed in the car department is about 275 men. During the year 1871, the number of freight-cars built was 430, and during the period from December 1st, 1871, to February 26th, 1872, about 140 of the same class of cars were turned out. The number of passenger-cars built annually will average one per month. All this is exclusive of repairing, which is kept well in hand and not permitted to accumulate.

But one style of box-car is now built by the company, and when a "grain door" is added, it is ready for any service on the road. Volute springs are used on all freight work with scarcely an exception. The trucks have iron frames with cast-iron pedestals and a wooden bolster and safety-beam. The frame iron is 3 by $1\frac{1}{4}$ inch, and the braces 3 by $\frac{3}{4}$ inch. Many of the cars were formerly fitted with rollers for side-bearings, but, owing to bad design and worse construction, they have not worked well, and as fast as they come in, they are taken out. The rollers were cylindrical, about three inches in diameter, and set on a cast-iron surface not chilled. When they reached the extent of their travel, the jaws between which they rolled did not have a sufficient height to raise them off the plate, which, as a consequence, got badly cut. These faults, of course, utterly ruined the rollers, and made them about as good as nothing at all. All the new iron trucks are fitted with the ordinary side bearings of good length, which give perfect satisfaction, owing to the fact that the truss-rods throw the weight of the car mainly on the centres—a point of great importance. The iron truck will weigh 4200 pounds without the brake. A pair with one brake will weigh 8600 pounds. They are very strong and very safe, the number of accidents which occur in the use of them being very small. This was manifest from an inspection of a wrecked freight-car which was standing in the yard at the time of our visit. They are designed to meet the demands of a traffic requiring very strong cars. As an example which may be regarded as an extreme case, a stock-car, loaded at Albany for Northampton, was weighed at Springfield as it passed through, and was found to contain twenty-seven tons. The average weight of this class of cars on this road is not far from 19,000 pounds—rather under than above this figure. There are in the practical working of these cars some deviations from ordinary usage. Provision is made at the doors to enable a person inside to climb with safety upon the roof. The draw-bar buffer springs and bunter-blocks have a certain resemblance to the Miller trussed platform. The bunter-block is placed directly over the draw-bar, which is held between two very stout oak sticks framed into the transom and end sills. The strain of the draught is taken not only by the vertical bolts which hold the draw-bar plates to the sills, but by two three-quarter inch rods which pass into the bolsters, where they are held by nuts and washers. Should two cars shut up solid, carrying away every thing but the bunter blocks themselves, there would still be about fourteen inches between the sills; and as these blocks are on the sills, the end of the car would have to be crushed before the cars could come nearer in contact. This construction diminishes the danger in shackling to a minimum.

The shops are very busy now in turning out a hundred or more grain-cars for a through line of freight. These cars are of a bright yellow color, and in the sunlight look like a flame of fire. Notwithstanding the brilliancy of the color, it will probably be a durable one, and it would not be at all surprising if this same flame-colored yellow or orange should become a common one on our freight lines. The lettering, iron-work, etc., are, of course, black. The boarding is horizontal. Inside, the cars are sheathed up to the usual height. This sheathing is tight at the bottom, and the space at the top is closed so that nothing can drop down behind it

BOSTON AND ALBANY PASSENGER-CARS.

The standard passenger-car on the Boston and Albany road seats 72 passengers, without a stove and with one saloon. They are 54 feet long, and 9 feet 6 inches wide outside, with the usual raised roof. They have four-wheel trucks with swing-beam and long-connection. The wheels are all Washburn's improved steel tire. The average weight of the cars is 44,000 lbs., or 611 lbs. per seat. Rubber and steel springs are used; the former on the equalizers, and the latter (Dinsmore nest-spirals) on the swing-beam. The cars are rather longer than the ordinary styles, and much heavy work is necessary to give them the requisite strength. The entire line of the road is far from being a straight one. The western end, particularly, has numerous curves and grades, which make heavy work for the express trains especially, which run at a high rate of speed.

With respect to the framing of these cars, it may not be amiss to mention that 8 sills are put in each—6 of Southern pine and 2 of spruce. The outside ones are $5\frac{1}{2}$ by 8 in., and the inside ones 4 by $7\frac{1}{2}$ in. The are $3\frac{5}{8}$ by $1\frac{3}{4}$. The truss-plank is screwed to each post by two one-half-inch lag-screws, and is considerably heavier than necessary, being 12 inches deep and $2\frac{3}{4}$ inches thick in the cars now in use. An improvement, however, will be made in this respect by reducing the thickness to 2 inches. A material reduction will also be made in the weight of the braces between the windows. By doing this, and slightly altering the shape of the stick, an increase of strength will also be gained; in fact, in all the contemplated changes designed to diminish the weight, nothing will be done which in any way impairs the strength of the frame. On this point nothing is experimental or involved in any uncertainty, but the effect of every alteration must be demonstrated or it is not made.

In the roof, 8 iron carlines or rafters are used, each $2\frac{3}{8}$ by 3. The ends of these are twisted so as to take a bearing on the outside plate. They are held down by a $\frac{3}{8}$ bolt. The outside plate of the roof is $5\frac{1}{2}$ by $2\frac{3}{4}$. The deck-sills are triangular, and made of Southern pine. The top-plates of the deck are $5\frac{7}{8}$ by $2\frac{7}{8}$. In the raised roof there are two windows and a ventilator alternating. On the value of the sills in the roof there will, doubtless, be more or less diversity of opinion; especially as it is claimed by many that longitudinal strength is not needed in the roof. It seems plausible, however, that a proper amount of "furring," between the carlines especially, if held in place by light rods, might be made to take the place of at least two of the plates in the roof. If this construction is adopted, it would become necessary to frame the carlines together, or at least eight or ten of them, making them approach somewhat the strength of the iron carlines. It would seem that the perpendicular part of the raised roof, if properly managed, might be converted into a longitudinal beam so strong as to dispense with all except the side-plates.

The window-sills of these cars are very thin iron castings. A raised lip around the edge precludes the possibility of water getting into the posts or down to the side of the car. They weigh seven pounds each. It is possible they might be lighter, and serve their purpose equally well. All joints in the panels below the windows are covered with band-iron $1\frac{1}{4}$ wide, and put on carefully with screws. The panels are $\frac{3}{4}$ inch thick, and painted inside.

We were shown a drawing-room coach in the shops which has several features worthy of notice. The first of these is the method by which the truss-plank has been retained in effect while actually thrown aside. Instead of this plank, an arched truss-plank of ash, 5 by $\frac{7}{8}$ inch, is carried along in the walls. Taking a bearing on the sill at each end, it rises in the centre until it comes nearly up to the window-sills. All the framing is screwed to this plank, and straps passing through the sills are turned over its upper edge, and screwed down tight so as to give the full benefit to the sill of its arched form. This plank, together with the braces, posts, and "furring," are so framed and screwed together as to form in effect a single truss as deep as the wall of the car below the window-sills. The whole forms probably as strong a truss as could be made with an equal weight of material.

The interior finish of this car is very fine, consisting entirely of natural woods. Owing to the peculiar construction of the car-walls, the finish beneath the windows has been made panel-work. These panels are ash-burls beautifully figured; these are glued upon a raised panel of red cedar, so that the edge of the cedar is visible around the panel; this in turn occupies the centre of a French walnut panel which is surrounded by a rosewood moulding. These combinations are kept up through the entire finishing of the interior, black-walnut forming the background of the whole. All the paneling is perpendicular, which materially increases the apparent height of the car. The central saloon is 30 feet long, and is seated with pivoted chairs screwed to the floor. At the ends of the saloon are state-rooms; one with eight seats, one with four, and another with two. There are also the usual closets, washing and baggage-rooms. The windows are hung with cloth-covered weights running on glass pulleys, and raise twelve inches. No heavy cloth curtain is used, but in its stead a light wooden roll-blind, which keeps out the sun, and at the same time admits air, and allows observation through the openings. The windows are hung with green lambrequin, with bullion fringe. Every thing considered, the car is one of the handsomest we have seen, the construction throughout being skillful and workmanlike, and the ornamental design and finish harmonious and tasteful. The head-linings are specially deserving of commendation. They were all painted in the shops, and are altogether creditable in an artistic as well as mechanical point of view. The scroll-work, also, is as fine as can be found on any cars in the country.

The Westinghouse Brake.

THE practical value of this brake was sufficiently demonstrated on the occasion of the late accident near Springfield. The engineer perceived that something was wrong on striking the broken rail, and at once put on the brake. The locomotive and tender and one car went over the broken rail safely, four cars rolled down the embankment, breaking off the connection with four sleeping-cars in the rear, but the latter were checked and saved from wreck, probably saving many lives. Many persons suppose that when the connection between parts of a train is broken the air-brake loses its efficiency. This is not so. Attached to the cylinder which conveys the air are valves between each car, which shut down and hold the air, continuing the pressure of the brake whether the connection is broken or not. This is one of the chief merits of the invention. Many lives, as well as a vast amount of property, would be saved annually if the air-brake should be adopted universally.—*Railway Times.*

THE Pennsylvania Company, with its branches and leased lines, is by far the greatest railroad corporation in the world, and the influence and power is being constantly increased by new conquests. The gross revenue from the lines operated by this company in 1871, amounted to $22,262,100.08.

EIGHTY cars a month are being made for the Chicago trade by the Michigan Central Railroad Company. A number of first-class locomotives are also in process of construction. The Illinois Central Railroad is building about fifty cars a month.

The National Car-Builder,

PUBLISHED MONTHLY,

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VOSE, DINSMORE & CO.,

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Correspondence.—*We cordially invite the coöperation of the railroad public in affording us the material for a good mechanical paper. Articles relating to rolling stock and machinery, by those practically acquainted with those subjects, will be gratefully received. All communications must be addressed to Vose, Dinsmore & Co., No.* 1 *Barclay Street.*

The name and address of the writer must accompany all communications designed for publication.

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Engravings and Illustrations.

We would invite the attention of Master Car-Builders and others to the advantages to be derived from publishing in The National Car-Builder *engravings designed to illustrate the various features and details of car construction, and especially such improvements as can not otherwise be clearly presented. We will procure cuts to be made in the best manner from drawings or models that may be sent us, and charge only for the cost of engraving, inserting the same in our paper with suitable descriptive details, without charge. The cuts thus made by us, or that may be sent us for use in* The National Car-Builder, *will of course be returned promptly to the owner.*

Master Mechanics' Association.

It will be seen by the following circular, that the annual meeting of this association will be held on the 11th of June, instead of the second Tuesday in May, as provided in the constitution:

Secretary's Office, American Railway Master Mechanics' Association, Cincinnati, April 20, 1872

To the Members of the Association:

Gentlemen: The General Supervisory Committee have received communications from a number of the members, asking that the time for the annual meeting be changed to a later date than that fixed by the constitution. Circulars have been sent to the members, in order to obtain an expression of opinion upon that subject. Of the whole number of answers returned, 125 favor the change, and 8 oppose it. Hotel accommodations can not be procured for the 18th of the month. Your committee therefore give notice that the fifth annual meeting of the association will be held at the American House, Boston, Mass., June 11th, 1872.

H. M. Britton,
N. E. Chapman,
J. B. Pendleton,
J. H. Setchel,
General Supervisory Committee.

The annual meeting of the Master Car-Builders' Association will be held at St. Louis, on Wednesday, June 12th. We trust that the importance of a full attendance is duly appreciated by every member, especially those who reside at points remote from the place of meeting.

The Advance in Iron.

The recent advance in the price of pig and manufactured iron is an event which shrewd observers, who are familiar with the sources of supply and the statistics of consumption, are not much surprised at. It is evidently not the result of corners, strikes, or combinations, but has been brought about in a manner entirely legitimate. Production has not kept pace with demand. Iron has become one of the necessities of existence, as indispensable to the well-being of humanity, or nearly so, as the element of air or water. In the wide range of our productive industry, it is the prime factor, the one thing needful, without which civilization itself would collapse, and barbarism come again. Railways alone require an enormous and constantly increasing supply, while new uses of the material are being discovered day by day. An iron architecture has been developed within the last few decades. The entire frame-work of vast buildings in our cities with all their elaborate ornamental appendages, ships of the largest class, railway and road bridges on a gigantic scale, and machinery of every description, are now constructed of iron, to say nothing of the thousand and one purposes of utility, aside from these, to which it is applied. With this prodigious, ever-increasing demand, the production has not kept pace. It is not necessary to work out the problem in all its intricate and complicated details as to how the thing has happened. Suffice to say, the great want of the age is cheap iron, and this can not be had so long as the supply is inadequate. More mining capital must be employed at home. We have inexhaustible stores of ore and coal, and can produce our own iron in unlimited quantities, or sufficient at least to meet the demands of domestic consumption, great as it is. The rise in the price will attract capital and enterprise in that direction, in obedience to a fixed law; and, although high prices will doubtless rule for some time to come, the ultimate result will be a largely increased production, and a consequent return to lower prices.

That the present upward tendency of the iron market will have a damaging effect on railway interests, is more than likely. The progress of many projected roads will be retarded, and a check will be given to various branches of industry, the growth of which is dependent more or less upon the resources these roads are designed to develop. This, however, may not be an unmixed calamity, even if it is not a blessing in disguise. The law of compensation is immutable, and never fails to assert its supremacy in all the apparent complications of business and traffic. Cherished plans and favorite schemes may have to be abandoned for the time being as a matter of necessity, until the equilibrium is restored in the relations of producer and consumer, when it will, doubtless, be discovered that these suspended enterprises can be resumed and carried to completion under better auspices and with more satisfactory results than were ever anticipated by their projectors.

We do not imagine that car-building will suffer any very great detriment in consequence of the present disturbance in the iron market. The roads in operation must keep up their freight and passenger equipment to meet the requirements of their business, which will not admit of any material curtailment either in repairs or construction. The road-shops are all busy, so far as we can learn, and the regular manufacturers have large contracts ahead. Indeed, the demand for cars of every class during the past year has been so great that several new companies have been organized with ample capital and facilities for executing the work in prospect.

Our next number will contain some additional car-shop notes from the Eastern States.

George C. Hall, a director and purchasing agent of the Erie Railway Company, died at his residence, in Brooklyn, on the 25th ult.

The Committee of the Master Car-Builders' Association on the "Dictionary of Terms" met at the Astor House, in this city, on the 26th ult., and adjourned to meet again in Philadelphia, within the next four weeks, at the call of the secretary of the association. There was a full attendance, consisting of F. D. Adams, of the Boston and Albany; M. C. Andrews, of the New-York and New-Haven; Leander Garey, of the New-York and Harlem; C. A. Smith, of the Erie; Joseph Jones, of the New-York Central; I. W. Van Houten, of the Pennsylvania; and A. Steinbach, of the Reading Railroad.

We ask the attention of car-builders to the views of a correspondent in regard to the comparative merits of oak and pine timber as a material for car construction. We have heard the opinion advanced, that the time is not very far distant when our native supply of oak will be so materially diminished as to compel the use of some other timber in its stead. The rapid destruction of our native forests is an admitted fact, and public attention is being directed more and more to the importance of the subject. Oak has hitherto been considered the most valuable timber for the various purposes in which strength and solidity are required, and consequently, the consumption of it has been greater in proportion to its abundance than that of many other kinds. Extensive pine forests abound both in the northern and southern sections of the country; and if the views of our correspondent are correct as to the superior adaptation of this timber to purposes of car-building, as compared with oak, the sooner the fact is recognized, and its superiority established by practical test, the better.

Our acknowledgments are due to the gentlemen connected with the car-shops of the Boston and Albany road, at Springfield, and those of the New-York and New-Haven road, at New-Haven, for attentions received by Mr. W. E. Partridge during his recent visit to those places, and for the interesting information communicated to him, and which appears under the head of "Car-Shop Notes" in our present issue.

Our readers will please notice that Messrs. Vose, Dinsmore & Co. have recently removed their machinery, for the manufacture of volute car-springs, to Pittsburg, Pa., and that all shipments of such springs are now made from that point. Orders for the same should be addressed to their office in New-York, as usual, and not to Pittsburg.

The extensive works of the Harrisburg Car Company, at Harrisburg, Pa., were entirely destroyed by fire on the 25th ult. Loss, $300,000, about half of which is covered by insurance. It is announced that the works will be immediately rebuilt.

Multum in Parvo.

We have received a copy of the fourth edition, revised and enlarged, of *Useful Information for Railway Men*, compiled for the Ramapo Wheel and Foundry Company, by W. G. Hamilton, engineer. We doubt if any miniature pocket manual has ever been published containing in so small a compass such a quantity and variety of information upon every topic pertaining to the mechanical departments of railways. There are nearly 600 pages in clear type, and printed on paper so thin that the volume can be carried in a small side-pocket without incumbrance. The contents include useful and practical statistics, rules for the solution of mechanical problems, reliable information on the quality and treatment of metals, the details of locomotive and car construction, bridges, the operating of railroads, cost of materials, and hints and suggestions upon innumerable topics, the value and convenience of which every railway man will readily appreciate. The volume also contains a great number of appropriate illustrations.

Correspondence.

The Best Timber for Building Cars.

EDITOR OF THE NATIONAL CAR-BUILDER:

DEAR SIR: Being myself a car-builder, I would be very glad to hear, through the medium of your journal, the views and opinions of other car-builders and railroad men generally, who have given the subject due consideration, with respect to the best, lightest, cheapest, and most durable material for building cars.

My impression is, that oak should be discarded altogether, and pine substituted in its stead. This impression is based upon the fact that, in my own experience, I have always found that pine lasts longer than oak, and is generally more reliable in every way. Oak of the very best quality invariably gets short in the grain after being cut, even when kept close and dry, and is therefore very liable to break. Ordinary fresh pine, dry and free from sap-wood, has been uncovered after the lapse of centuries, and found to be as good as when it was first cut, if not, in many instances, stronger and better. Our oak and pine of native American growth, when placed together for comparison as to durability, show the following results, namely: that the oak does not rot, but gets weak and brittle, while the pine gets tougher and stronger the longer it stands, and from its lightness and great capacity of tension, would seem to be the most suitable of all timbers for the purpose of car construction. In view of the rapid extension of our railways, and the corresponding increase of rolling stock required for their equipment, this is, in my judgment, a subject deserving of more attention than it has received, and I trust that car-builders and others will give expression to their views upon it, and oblige a CAR-BUILDER.

Cleveland and Pittsburg R. R. Car-Shops.

CLEVELAND, OHIO, April 17, 1872.

EDITOR OF THE NATIONAL CAR-BUILDER:

DEAR SIR: Upon visiting the car-shop of the Cleveland and Pittsburg Railroad, at this place, to gather some items for your valuable journal, I was surprised to see so many additions and improvements in the way of machinery had been made since my last visit. Every thing is systematic and well organized. There seems to be a place for every thing, and every thing in its place.

The main shop is of brick, 180 by 80 feet, and has two tracks running through it lengthwise, upon which eight freight-cars and four coaches can be built. On the north side of these tracks is placed the machinery for car-work, to which has recently been added an axle-lathe, a wheel-borer, and wheel-press, all from the Industrial Works of Philadelphia. These are fine specimens of machinery, and give entire satisfaction. On the opposite side of the shop are the work-benches, where the framing is done. Aside from the main shop is a large wooden building used for making repairs; also a paint-shop, with track-room for three coaches.

The car equipment of this road consists of 36 coaches, 24 baggage, mail, and express cars, and 1,600 freight-cars. These numbers include 2 coaches and 200 coal-cars now building in the shop, one of the coaches being in the hands of the painters, and the other receiving the inside work. As regards design and finish, these coaches combine all the requisite good qualities that constitute a first-class car. Like all the others on the road, they are only 42 feet long, exclusive of platform, and 10 feet wide over all. Only two longitudinal sills are used, and they are extra heavy. They have cross floor-sills; and for a coach of this length, trussed as they are, the bottom frame-work is very stiff and substantial. As an evidence of the superiority of this style of construction, I would say that I have seen coaches that were built at this shop in 1862, and framed crossways, that are as straight now as they were when first built, and apparently in first-rate condition in every respect. On the other hand, this road had six coaches built at contract shops in 1866, and framed with six longitudinal sills, and they are now nearly ready for the scrap-heap. A very good device is used to truss the car over and each way from the transom, consisting of an iron plate, 2½ inches wide by ⅜, and 12 feet long, which is placed just under the windows on the inside of the posts, and let into them flush. From each end of the iron it is returned and meets at a central point on the sill and just over the transom. At the extreme ends of this truss-iron, (it being all welded together,) are two ¾ eye-bolts running down through the side sill, by the use of which the ends of the coach can always be kept straight. This manner of trussing the ends is certainly the best I have seen, being specially serviceable in coaches using the heavy Miller or Blackstone platforms. The transom is 4½ by 13 inches. The centre of the car never touches the transom, no matter how much it may spring up. The floor over it will always remain level.

The inside work is exceedingly neat and tasteful, nothing being overdone. The ground-work is of black-walnut, trimmed and moulded with ash. Not a piece of veneer is used in these coaches. The windows are 2 feet by 3, and shaped the same as in the Pullman sleepers. In putting them in, all stops are done away with. The groove on the left side is twice as deep as that on the opposite side, so that the sash or blind can be pressed clear into the deep groove, and then slipped into the opposite one, the springs on the left edge keeping them to their place. Heretofore, the roofs have all been made shell-shaped; but these two are of the raised pattern, the upper roof running the whole length of the inside of the coach, and then, with an easy curve, slopes down to the canopy roof. This style of roof has no cross-rafters to show inside, which gives to the interior a high, roomy, and airy appearance, with no obstruction from end to end. The head-linings are placed in position on the ceiling before being painted, and, judging from the progress already made in the painting of them, they will, when finished, be second to no other in thoroughly artistic design and execution.

The Westinghouse brake is now used on the passenger trains of this road. The master mechanic, Mr. N. E Chapman, is now subjecting to a thorough test an invention of Mr. J. W. Gardner, to "set" or "force off" brakes by air or steam, and from the report of its working given by Mr. Chapman, it really appears to be *the* brake, being cheaper, more simple in construction, more durable, and doing more work than any other air or steam brake now in use.

Mr. Chapman, who has exclusive charge of the mechanical department of the road, is a gentleman whose ability and skill in his vocation is widely recognized, and none the less so from the fact that the Ohio Railroad Commissioner, in his annual report, awarded the palm to the Cleveland and Pittsburg road, for having the best machinery in the State. Mr. A. Stinebrunner is the foreman of the car department, for which position his large experience and long and faithful services eminently qualify him. Mr. Bishop, the foreman of the paint-shop, is deserving of special notice, from the fact that of all the cars and locomotives that leave Cleveland daily, those of this road are conceded to be the most beautifully painted and ornamented. My special acknowledgments are due to Mr. Stinebrunner, for his courtesy in furnishing information, and affording facilities for the matter embodied in this communication. MACK.

Car Ventilation.

EDITOR OF THE NATIONAL CAR-BUILDER:

DEAR SIR: I have noticed, in several recent numbers of your journal, articles on the somewhat trite and threadbare topic of car ventilation; and, judging from the tenor of some of them, I can not but think the writers are deficient in a practical knowledge of the real nature of the problem they are so anxious to solve. I do not undertake to say that ventilation is not required in railway cars, but, on the contrary, I am ready to admit that no place needs it more. I do protest, however, against the ventilation of so many crude and ill-considered suggestions and theories on the subject. The truth is, that railway cars are, as a general thing, provided with the means for securing more ventilation than is used or required. I do not travel as much, perhaps, as the correspondents, reporters, and others whose business it is to prepare articles for the newspaper press, and who are rather prone to take for granted every thing they hear said about this subject, whether it involves mechanical principles or whether it relates to natural laws affecting the atmosphere. I have for many years been familiar with the operating of railroads, and especially with the construction of freight and passenger rolling-stock. My business frequently requires me to make trips over the road with which I am connected, and on these occasions I have often noticed, when passing through a train, that the air was close and stifling in some of the cars; but, on looking up, I noticed that the ventilators were all, or nearly all, closed. The means provided for renewing and purifying the air in the vehicle were not made use of, although they were quite sufficient for the purpose. The trouble in this and all similar cases is, that the use and regulation of the ventilators are dependent partly on the caprice of passengers, and partly on the conductor and brakemen. This difficulty I would overcome by making all car-ventilators automatic in their working, because brakemen and conductors have their time too much occupied with other equally or more important matters to admit of their giving much attention to ventilation, especially if there is no complaint on the part of the passengers.

Many people have an idea that the means usually resorted to for the ventilation of a house or of a room are equally applicable to a railroad-car. This, however, is a great mistake, as any one must see who gives the matter a little careful consideration. A house or a room is stationary. It is not constantly exposed to the cinders and dust which accompany a fast-moving train. The external air can be admitted in any way that is desirable, and the inmates can avoid the inflowing current or otherwise, as prudence may suggest. But a railroad train, moving at the rate of forty miles an hour, with every car crowded with passengers, sick, well, and convalescent, young and old, rough and delicate, jolly and sober, and entertaining the most diverse and conflicting views about fresh air and ventilation—this, I submit, is entirely a different case from an ordinary dwelling-house. The bulk and rapid movement of the train causes a partial vacuum as it forces its way through the surrounding atmosphere, and this draws the cinders thrown out by the locomotive, and the dust from the track stirred up and set whirling by the onward rush of the train, and inclines both toward the cars; and whatever openings there are on the sides or roof of the cars to let in the air, are sure to let in cinders and dust also, so that the annoyance of insufficient ventilation is rather increased than diminished, by admitting the fresh air combined with another enemy equally annoying.

To devise a plan of ventilation that will obviate all the difficulties alluded to is no easy matter. It is a problem yet to be solved; and so long as it remains unsolved, we shall doubtless have innumerable plans and devices presented by amateur mechanics and newspaper engineers, who take little account of the practical difficulties to be surmounted, and are consequently surprised to see so many of their theories come to grief when subjected to actual test.

I do not say that some improvement can not be made in the methods now in use. Little by little, the observation and experience of practical mechanics and scientific men will remedy what is now defective, although a perfect remedy may not, in the nature of the case, be attainable. ADAMS.

MR. ISAAC DRIPPS, Superintendent of Machinery of the Pennsylvania Railroad, has resigned, and Mr. G. Clinton Gardiner, who has been Mr. Dripps's assistant for some time, is appointed to succeed him.

Miscellaneous Items.

THE Leavenworth (Kansas) *Times*, of April 5th, says, "Yesterday an excursion train, consisting of the engine Leavenworth, a smoking-car, and two elegant passenger-coaches, carried a hundred and fifty ladies and gentlemen of the city to Hund, eight miles; time consumed, thirty-three minutes. Every one pronounced the 'narrow-gauge' a complete success, and praised the excellent construction and elegant equipment of the line. So far as convenience to the traveler is concerned, there is no difference between a broad and narrow-gauge car. The motion of the latter is quite as smooth, and the narrow-gauge train can safely move at as high a rate as is ever used on Western roads."

THE Litchfield Car Manufacturing Company, a joint stock company, organized under the general incorporation law of the State of Illinois, have taken possession of the old shops of the Indianapolis and St. Louis Railroad, and are preparing them for use as rapidly as possible. They have ordered all the machinery, and expect to begin operations in the beginning of May. This company, organized with a subscribed capital of $100,000, has received a bonus of $15,000 from the citizens of Litchfield, and the lease of the shops for fifteen years from the railroad company. They took their first contract of five hundred box-cars for the Indianapolis and St. Louis Railroad two weeks since. The officers are: E. R. Stiles, President; H. H. Beach, Vice-President; W. E. Bacon, Secretary and Treasurer; M. M. Martin, General Superintendent; Southworth & Zink, Attorneys.

TWO elegant day-coaches, called "Venus" and "Mercury," and built by the Pullman Palace Car Company, left Chicago recently for Philadelphia, and are designed to run between that city and New-York. They are represented as being of the superlative order in an artistic and mechanical point of view. Besides being thoroughly well-built and supplied with every appliance for safety, they are comfortable even to luxury. Their workmanship is simply perfect in every particular; the wood-work elaborately wrought and deeply inlaid with African and other foreign wood—with decorations, in fact, superfluous, except as showing the staid people of the Quaker City in what sort of vehicles Young America of the West is wont to beguile the tedium of travel by the devices of art and the handiwork of cunning workmen.

SUPERINTENDENT RUCKER, of the Erie Railway, reports to the directors that of the four hundred and ninety-five locomotives on the road, four hundred and seventy-seven are available. Most of the freight and coal-cars are in good condition. Thirty new passenger-coaches and ten baggage-cars are building. The shops, tools, etc., are in good condition. During the first five months of the fiscal year, one thousand seven hundred tons per month of steel-top rails have been laid. Five hundred and fifty thousand cross-ties will be required for the track during the coming summer, a large proportion of which are on hand. The bridges, with a few exceptions, are in good condition and considered safe.

THE Hinkley & Williams Locomotive-Works, at Boston, Mass., are in full blast. During the last month, two passenger-locomotives were constructed for the Boston and Maine Railroad—one with cylinders 17 by 22 inches and 5 feet 6 inches driving-wheels, the other with 5-feet drivers. Two freight-locomotives were also made for the Hartford and Erie Railroad, and locomotives for the Boston, Lowell, and Nashua Railroad, the Worcester and Nashua Railroad, and other roads.

THE Iron Mountain Railroad, of Missouri, have contracted for twenty-five new locomotives and several hundred new freight-cars, and the company is also building freight-cars in its own shops, at Carondelet. Activity prevails along the entire line as far south as Little Rock, in Arkansas.

THE Pittsburg, Cincinnati, and St. Louis Railroad Company have ordered eighty locomotives to be completed the present season.

THE Pittsburg Locomotive-Works are to be largely increased in their capacity, so as to be able to turn out six or more locomotives per month.

THE Newport and Cincinnati Railroad bridge, 3800 feet long and 103 feet above the water, built under the direction of its chief engineer, Mr. J. H. Linville, was tested on Tuesday last with five heavy engines and tenders coupled together. The channel span, 420 feet long—the longest railroad span on this continent—deflected only $1\frac{1}{16}$ inches. The bridge has been formally opened.

THE great bridge crossing the Missouri River, connecting Omaha with Council Bluffs, is completed. It is 50 feet above high-water, and consists of 11 spans, each 250 feet wide, resting on 11 piers of cast-iron columns of $8\frac{1}{2}$ feet in diameter, filled with cement masonry. It cost almost two million dollars, and occupied over three years in building.

THE great iron draw-bridge across the Mississippi at Winona, Minn., was put in operation lately. Its length is given at 360 feet, and is the longest draw in the world.

EIGHTY cars a month are being made for the Chicago trade by the Michigan Central Railroad Company. A number of first-class locomotives are also in process of construction. The Illinois Central Railroad is building about fifty cars a month.

THE Philadelphia and Reading Railroad Company pronounce against steel-head rails, on account of the head separating from the body, owing to a difficulty originating in the "pile" while rolling. They have removed twenty-five per cent of all they have laid down.

SEVERAL handsome new passenger-cars for the use of the Ohio and Mississippi Railway have lately been turned out from their shops in East St. Louis, and are models of beauty and finish.

THERE is a movement on foot among some of the railroads to conduct, control, and manage the package express business on their roads, and thus derive the benefit of the profits on this class of traffic themselves, instead of the express companies.

THE grading for a double track on the Michigan Central Railroad, with the exception of seventy miles, will be completed by the 1st of September.

A WRITER says that more than 150,000 acres of the best timber in America are cut every year to supply the demand for railway-sleepers alone. In a single year the locomotives in the United States consumed $60,000,000 worth of wood.

THE Illinois Central Railroad is doing an immense business. It runs more and heavier trains than at any time since the road went into operation.

THE Chicago and Alton Railroad has the credit of running the handsomest train of passenger-cars in the country, and very justly so.

Publishers' Notices.

CAR AND COACH VARNISHES.—There is no more important or indispensable article required in the finishing and decoration of passenger-coaches than varnish. It also protects the wood-wood from the action of the atmosphere and the deleterious effects of moisture. Every car-builder is aware how desirable it is to procure a quality that will meet these requirements; and we take pleasure in calling the attention of this class of purchasers to the advertisement of Messrs. Edward Smith & Co., (late Smith & Stratton,) who make the manufacture of car and coach varnishes a specialty. Their works were established in 1827, and the reputation of their varnishes is such as can only result from long experience and uniform and continued success.

VENEERS AND FANCY WOODS.—Having visited some of the warerooms of our advertisers who deal in this class of material, the consumption of which is so large and increasing in the department of car-construction, we can testify to the completeness and variety of the stock, including choice and beautiful specimens of native and foreign woods. Did our space permit, we should like to give a more particular and extended notice of the contents of the several warerooms alluded to, but for the present must content ourselves with referring our readers to the advertisements of George W. Read & Co., 170 Centre street; Joseph F. Paul & Co., 242 Canal street; Cole & Comstock, 191 Chrystie street, and A. Parker & Co., 166 Centre street.

ORNAMENTAL GLASS.—This is another of the many articles without which a passenger-coach would be a comparatively plain and incomplete affair. The art of manipulating this material has been brought to such a degree of perfection as to make it one of the most important adjuncts in the finish and ornamentation of railway coaches, to say nothing of its utility and comparative cheapness. We direct attention to the advertisements of A. S. Taylor & Co., 63 Elizabeth street; Thomas Jones, corner of Franklin and Centre streets, and D. A. Van Horne & Co., 84 Reade street, at whose several establishments may be found every variety of plain and ornamental glass, including ground, cut, embossed, enameled, etc., suited to the wants of car-builders.

ANTI-FRICTION GLASS BEARINGS.—The use of glass bearings for the wearing surfaces of cross-heads, pistons, and other working parts of machinery has been steadily extending for a number of years past. They are now very extensively used in locomotives and stationary engines, and the manufacturer is furnishing them to all parts of the country and for all kinds of steam machinery. Judging from their success, it seems probable that the use and application of glass for wearing surfaces will increase rapidly, and that a greater variety of ways of applying it will be adopted. The manufacturer, Mr. John Harden, 48 Broad street, New-York, has been very successful in introducing them, and finds the demand steadily increasing. See advertisement and illustration.

SOWLE'S PATENT DOWEL BRAD.—Every car-builder is aware of the trouble of finishing a good piece of work after the panels and other decorations are put on, particularly now that almost all good work is covered with veneered panels, and these to be finished in copal varnish, while the other parts are finished with oil and shellac. He knows, too, how much better a job could be made to look, if the parts could be finished separately, and the panels and decorations put on afterward; but as it is impossible to do this after both are finished, the finisher must get around the edges and corners as best he can. By the use of the dowel brad, the polished panels, rosettes, small carvings, etc., can be put on after being finished. For description, see advertisement.

Porter, Bell & Co.

AN error occurred in correcting the list of locomotive-builders for our April number, by which the name of Messrs. Porter, Bell & Co., builders of light locomotives at Pittsburg, Pa., was omitted. We make the correction in our present number by inserting their name in its proper place; and in doing so we take pleasure in saying that this enterprising firm make the construction of engines adapted to narrow-gauge roads an exclusive specialty. They have recently completed extensive shops in a most eligible location, and arranged with special reference to this kind of work. The best of machinery is used, and their facilities of every kind are such as to enable them to execute orders with the utmost dispatch, and to furnish engines of the various styles required for narrow-gauge service at reduced prices. Within the past year they have built forty locomotives, for mining and manufacturing purposes, and have orders on hand

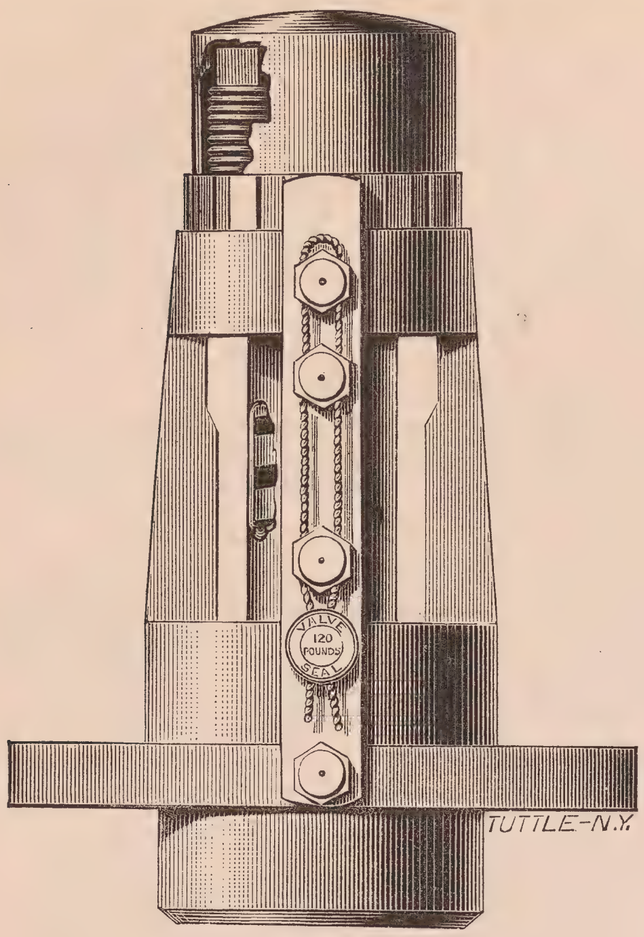

FIG. 1.

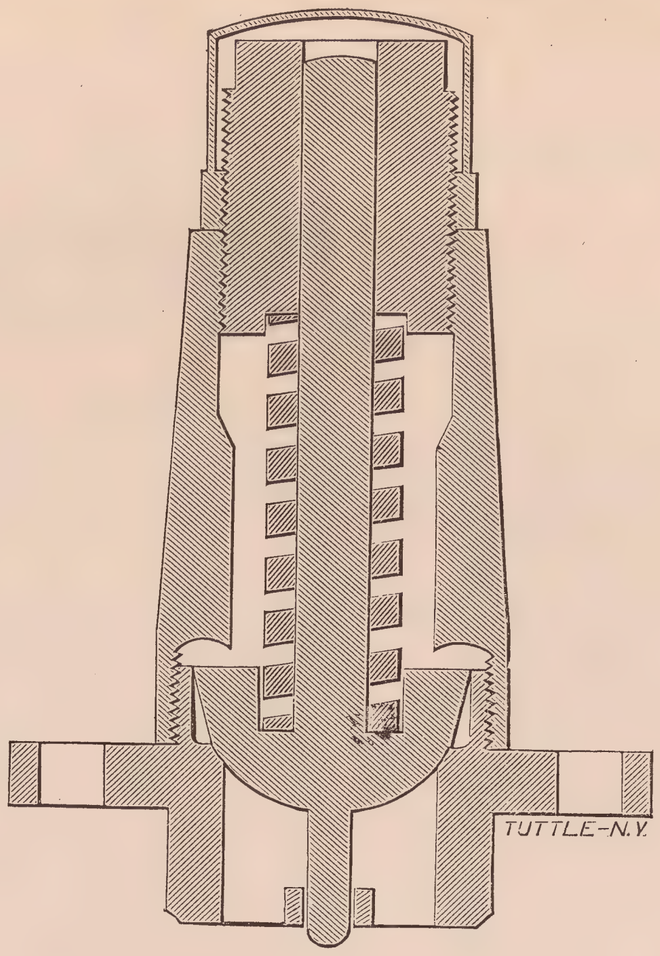

FIG. 2.

Prescott's Patent Safety-Valve.

for many more, as well as many orders for narrow-gauge passenger locomotives, among which are four for the St. Louis and Cairo narrow-gauge road. Their passenger locomotives are a model of compactness and completeness. Mr. H. N. Sprague is the mechanical manager, an old and well-posted locomotive engineer and builder, who seems to know just what is wanted and what facilities are required to supply the want.

Prescott's Patent Safety-Valve.

THIS valve is claimed by the inventor to be an improvement in many important particulars upon those now in use. It is simple in construction and not liable to get out of order or leak, being made of the best quality of metal and without complicated details. It has the requisites of strength and durability, and can be adjusted to any required pressure, and sealed so that the adjustment can not be disturbed without detection. It opens and closes with a loss of only one or two pounds of steam, and makes less noise in blowing off than other valves. Grinding the seat does not alter the working of it, as is usually the case with safety-valves.

Fig. 1 is an exterior view of the valve, with all its parts adjusted and in working order. Fig. 2 gives a view of the interior arrangement, representing the valve-seat, chamber, and spiral spring. The steam at the set pressure raises the valve from the seat, and the escaping steam, filling the chamber, gives the valve a further raise, allowing the steam to escape. There being a large difference in the area of the chamber between the seat and upper edge of valve, the working of it is positive. Further information in regard to it may be obtained from Messrs. Post & Kalkman, 111 Liberty street, New-York.

Facetiæ.

MR. LINCOLN used to tell a story of a boy who was ordered by his father to scare a stray urchin off the premises. He departed on his mission with a "turkey gobbler" strut, and shortly returned with a discolored optic, bleeding nose, and very much demoralized, and told his father the "darned boy didn't scare worth a cent."

THE Belfast (Me.) *Journal* says there is a man in that city whose boots are so large that he can't turn around in much less space than a quarter of an acre. He got stuck on the depot grounds the other day, and they had to put him on the turn-table to get them pointed right.

HENRY PEAD is the fastidious editor of the Martin County (Va.) *Herald*. Upon a late electioneering tour, he slept at a farm-house, with two others in the same bed, and the next morning the lady of the house inquired how they slept. "First-rate," answered one. "I slept behind, Bill slept before, and Henry Pead in the middle." "Did he?" exclaimed the old lady.

A GOOD story is told of a St. Louis nobby dry-goods clerk, who attended a dance in the rural district a few evenings since. He wore a Cheviot shirt, and put on a great many airs. He was somewhat taken down, however, when he overheard one country lass say to another, "That St. Louis chap slings on a heap of style for a feller that wears a bed-tick shirt."

ONE of the latest sensation stories commences with the casual remark, "Did you ever, gentle reader, have a tussle with a full-grown Bengal tiger?" The Chicago *Post* says, "We did; and if the king had turned, as we betted it would, we'd have come out $35 ahead."

A WESTERN farmer, being obliged to sell a yoke of oxen to pay his hired man, told him he couldn't keep him any longer. "Why," said the man, "I'll stay, and take some of your cows in the place of money." "But what shall I do," said the farmer, "when my cows and oxen are all gone?" "Why, you can then work for me, and get them back."

A BURLINGTON, Iowa, baby is immortalized by the following epitaph:

> "Beneath this stone our baby lays,
> He neither cries nor hollers;
> He lived just one and twenty days,
> And cost us forty dollars."

"MA," said a young miss to her mother, "what is emigrating?"

"Emigrating, my dear, is a young lady going to Nebraska."

"Ma, what is colonizing?"

"Colonizing is marrying there, and having a family."

"Ma, oh! how I would like to emigrate and colonize." That is what ails our Hanner.

SMITH and Jones were at the menagerie, and the conversation turned upon Darwin's theory. "Look at that monkey," said Smith; "think of its being an undeveloped human." "Human!" said Jones, contemptuously, "it's no more human than I am."

A SOUTHERN darkey, talking of some vain white man, said he was "one o' dem fellers what always wants to have de tail feathers of his chicken-pie painted pink."

AN original poem thus immortalizes the original settlers in Derryfield, N. H., the former name of Manchester:

> "It was often said that their only care,
> And their only wish and their only prayer,
> For the present world and the world to come,
> Was a string of eels and a jug of rum."

"No velvet cushions in our pews," said an old fashioned church-goer; "we don't go in for style. The fattest person has the softest seat, and takes it out with him at the close of services."

A DEMOCRATIC editor says, "We are living at this moment under absolute despotism." He married the wrong woman.

A WISCONSIN editor speaks of a wind which "just sat down on its hind legs and howled."

"IT is a solemn thing to be married," said Aunt Rachel, a solemn spinster, to her niece. "It's a great deal more solemn not to be," said the merry girl.

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PATENT ELASTIC FELT

For Car Seats, Mattresses, and Pillows.

ERIE AND ATLANTIC SLEEPING COACH CO.,
General Offices, 309 West 23d Street,
NEW-YORK, March 26, 1872.

F. W. BLOODGOOD, Esq., *President Patent Elastic Felt Co., P. O. Box 129, Jersey City, N. J.:*

DEAR SIR: Press of business and absence from the city has prevented me from saying to you earlier, that our experiment the past year, in using your Patent Elastic Felt for Pillows and Mattresses, in the coaches of this Company, has proved entirely satisfactory, and that I now regard it as decidedly preferable to hair and feathers. It does not pack like hair, is soft, durable, and withal cheaper. Respectfully yours,

WM. R. BARR, President.

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PATENT ELASTIC FELT CO.,
213 Canal Street.

DIRECTORY

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THROUGHOUT THE UNITED STATES AND CANADA.

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Alexandria & Fredericksburg			Alexandria, Va.
Alexandria, Nebraska & Iowa	Geo. Q. Adams		Alexandria, Mo.
Atchison, Topeka & Santa Fee	H. V. Farris		Topeka, Kans.
Atchison & Nebraska	Henry Ditz		Atchison, Kan.
Alabama & Chattanooga	H. M. Smith	H. M. Smith	Chattanooga, Tenn.
Atlanta & West-Point	Wm. Rushton		Atlanta, Ga.
Atlanta & West-Point	R. D. Cole		Newnan, Ga.
Atlantic & Gulf	C. Collins	J. Sullivan	Savannah, Ga.
Atlantic & North-Carolina	E J. Clayton	E. J. Clayton	New-Berne, N. C.
Atlantic & Great Western	John Van Vechten		Meadville, Pa.
Atlantic & Great Western	William Fuller		Meadville, Pa.
Atlantic & Great Western	N. Wright		Cleveland, Ohio.
Atlantic & Great Western		D. S. Dockstader	Meadville, Pa.
Atlantic & Great Western		W. G. Haggard	Cleveland, Ohio.
Atlantic & Great Western	Allen Cook	J. H. F. Wiers	Kent, Ohio.
Atlantic & Great Western		S. V. Smith	Kent, Ohio.
Atlantic & Pacific	John Hewitt	John Hewitt	Franklin, Mo.
Allegheny Valley	G. W. Glass	R. Gunning	Pittsburg, Pa.
Androscoggin	Ira K. Russell	C. S. Greenwood	Farmington, Maine.
Adirondack			Saratoga, N. Y.

B

Bangor, Old Town & Milford	J. B. Peckham	John H. Brown	Bangor, Maine.
Baltimore & Ohio	John C. Davis	John C. Davis	Baltimore, Md.
Bellefonte & Snow Shoe	H. D. Landis	H. D. Landis	Bellefonte, Pa.
Belvidere Delaware	R. McDowell	John Silvers	Lambertville, N. J.
Boston & Albany	Wilson Eddy	F. D. Adams	Springfield, Mass.
Boston & Albany	A. B. Underhill	W.E.Chamberlain	Boston, Mass.
Boston & Providence	George Richards	John Lightner	Roxbury, Mass.
Boston, Clinton & Fitchburg	John Webster	Samuel Stevens	Fitchburg, Mass.
Boston, Concord & Montreal	R. Adams	M. R. Elkins	Lake Village, N. H.
Boston & Maine	F. A. Waitt		Boston, Mass.
Boston & Maine		D. C. Richardson	Lawrence, Mass.
Boston & Lowell & W. L	L. R. Winslow	S. A. Davis	Boston, Mass.
Blossburg & Corning	O. C. Patchell	O. C. Patchell	Corning, N. Y.
Brockville & Ottawa	Joseph Cockfield	Joseph Cockfield	Brockville, Can.
Blue Ridge			Anderson, S. C.
Burlington & Missouri River	G. Chalender.	G. Chalender	Burlington, Iowa.
Burlington, Cedar Rapids & Minn	F. P. Messer		Cedar Rapids, Iowa.
Buffalo & Washington			Buffalo, N. Y.
Boston, Hartford & Erie	Geo. E. Boyden	Elias E. Pratt	Boston, Mass
Buffalo, Corry & Pittsburg	Thomas Connell	Thomas Connell	Corry, Pa.
Buff. Bayou, Brazos, Colorado	E. Perry	M. Borst	Harrisburg, Tex.

C

California & Pacific	O. R. Ford	D. Rutherford	Vallejo, Cal.
Camden & Amboy	F. B. Stevens		Hoboken.
	T. T. Kerr	E. Lockwood	Bordentown, N. J.
	Thomas Single		South-Amboy.
Camden & Atlantic	E. Collings	S. Wills	Camden, N. J.
Catawissa	A. J. Prescott	G. P. Fenstermacher	Catawissa, Pa.
Cape Cod	E. A. Walker	William Cannon	Hyannis, Mass.
Catasauqua & Fogelsville	Thomas Evans	Chas. S. Holbach	Catasauqua, Pa.
Carrolton & Oneida	M. T. Wiggins		Carrolton, Ohio.
Charleston & Savannah	H. T. Calder		Charleston, S. C.
Chesapeake & Ohio	W. G. Freeman	J. N. King	Richmond, Va.
Chesapeake & Ohio	T. J. Hamer		Huntingdon, W.Va.
Cheraw & Darlington	D. W. Haines		Florence, S. C.
Champlain Trans. Co.	H. T. Calder		Burlington, Vt.
Cheshire & Ashuelot	F. A. Perry	F. A. Perry	Keene, N. H.
Charlotte, Columbia & Augusta	Robert King	J. Q. Leats	Columbia, S. C.
Chicago & North-western		Thomas Hull	Chicago, Ill.
Wiscon. Mad. & Mill. Divis		Henry Hull	Fond du Lac, Wis.
Galena Division	R. W. Bushnell	Hugh Gray	Chicago, Ill.
Chicago Division	T. B. Tilton		
Iowa Division	C. C. Elliott	William Campbell	Clinton, Iowa.
Peninsula Division	S. L Pierce		Escanaba.
Chicago & Alton	John A. Jackman	R. Reniff	Bloomington, Ill.
Chicago, Burlington & Quincy	C. F. Jauriet	W. W. Wilcox	Aurora, Ill.
Chicago, Cincinnati & Louisville	C F. Kidder	D. B Howe	La Porte, Ind.
Chicago, Rock Island & Pacific	T. B. Twombly	B. K. Verbryck	Chicago, Ill.
Chicago, Michigan & Lake Shore	E. I. Reynolds		St. Joseph, Mich.
Chicago, Danville & Vincennes	J. A. Wood		
Cleveland, Col., Cin., & Indianapolis	L. S. Young	William F. Smith	Cleveland, Ohio.
Cleveland and Pittsburg	N. E. Chapman	N. E. Chapman	Cleveland, Ohio.
Cleveland, Mt Vernon & Delaware	J. W. Holloway	J. W. Holloway	Akron, Ohio.
Cincinnati, Hamilton & Dayton	William Cullen.	W. H. Allison	Cincinnati, Ohio.
Cincinnati & Zanesville	Peter Green	D. J. Jewell	Lancaster, Ohio.
Cincinnati & Indianapolis Junction	W. McKinzie	Edwin Beeny	Indianapolis, Ill.
Cincinnati, Sandusky & Cleveland	John Y. Beatty.	William Earick	Sandusky, Ohio.
Columbus, Chicago & Indiana Central	(See Pitts. Cinn. & St. Louis)		
Concord	Chs. L. Eastman	M. W. Dickerman	Concord, N. H.
Concord & Claremont	J. N. Lander	A. Langmaid	Concord, N H.
Connecticut River	John Mulligan	R. Hitchcock	Springfield, Mass.
Contoocook River			Concord, N. H.
Conn. & Passumpsic Rivers	Horace Alden	Horace Alden	Lyndon, Vt.
Cumberland Valley	A. S. Hull	C. W. Nitterhouse	Chambersburg, Pa.
Cumberland & Pennsylvania	W. L. Jordan	J W. Sauerbach	Mt. Savage, Md
Central of Georgia	B. Boulineau	C. C. Millar	Savannah, Ga.
Central of New-Jersey	*T. W. Peeples	George Hackett	Elizabethport, N. J.
Central Branch Union Pacific	Wm. D. Rowley		Atchison, Kansas.
Central R. R. of Iowa	W. J. Ribley	W. J. Ribley	Eldora, Iowa
Central Pacific	A. J. Stevens	Benjamin Welch	Sacramento, Cal.

D

Dayton & Union	A. J. Keenan	J. F. Feicht	Dayton, Ohio.
Danbury & Norwalk	Charles A. Craig	Wm. W. Bedient	Danbury, Ct.
Dayton & Michigan	William Cullen,	W. H. Allison	Cincinnatti, Ohio.
Delaware, Lackawanna & Western	Walter Dawson	Robert McKenna	Scranton, Pa.
Des Moines Valley	James Lamb	R. E. Smith	Keokuk, Iowa.
Detroit & Milwaukee	B. Briscoe	B. Briscoe	Detroit, Mich.
Delaware & Hudson Canal Co	James Dickson	Thomas Orchard	Carbondale, Pa.
Dorchester & Delaware			Cambridge, Md.
Dubuque South-western			Farley, Iowa.
Dutchess & Columbia	W. G. Vanbuskirk	H. A. Webster	Fishkill, N. Y.

E

Eastern		J. P. Somerby	Salem, Mass.
Eastern	John Thompson		East-Boston, Mass.
East Tennessee & Virginia	Eli Hixon	Jos. Armbruster	Knoxville, Tenn.
East Tennessee & Georgia	Eli Hixon		Knoxville, Tenn.

* Mechanical Engineer.

Railroad.	*Master Mechanic.*	*Master Car-Builder.*	*Residence.*
East Pennsylvania	J. M. Geary	Samuel Reeves	Reading, Pa.
Erie Railway	*E. O. Hill		Susquehanna, N. Y.
Erie Railway	James B. Gregg		
Erie Railway	H. L. Brown	C. A. Smith	Jersey City. N. J.
Erie Railway	M. E. Brown	M. Wilder	Buffalo, N. Y.
Erie Railway	W. E. Cooper	W. E. Cooper	Hornellsville, N. Y.
Erie Railway		W. E. Rutter	Elmira, N. Y
Evansville & Crawfordsville	John L. White	A. Sharra (fore'n)	Evansville, Ind.
Evansville, Henderson & Nashville	Jos. Crawford	W. H. H. Price	Henderson, Ky.
European & North Am. (of Maine)	A. O. Bailey	J. H. Brown	Oldtown, Maine.
Erie & Pittsburg	John Young	John Young	Erie, Pa.
Eldora			Dubuque, Iowa.

F

Flushing & North Side			
Florida	A. W. Taylor	G. Hernandez	Fernandina, Fla.
Flint & Pere Marquette	Sanford Keeler	Sanford Keeler	East-Saginaw, Mich.
Fitchburg	Geo. A. Cooledge	Enos Varney	Charlestown, Mass.
Fitchburg & Worcester	John Webster	Samuel Stevens	Fitchburg, Mass.

G

Grand Trunk	†Richard Eaton	J. W. W. McWood	Montreal, Canada.
Galveston, Houston & Henderson	Wm. Macbeth	Wm. Macbeth	Galveston, Texas.
Grand River Valley		James Potts	Jackson, Michigan.
Grand Rapids & Indiana			Fort Wayne, Ind.
Great Western of Canada	†Wm. A. Robinson		Hamilton, Canada.
Georgia	William Hardman	T. M. Preval	Augusta, Ga.
Greenville & Columbia	J. T. Price	J. T. Price	Helena, S. C.

H

Harlem Extension	George W. Blanchard		Rutland, Vt.
Harlem Extension		C. S. Clapp	Bennington, Vt.
Hanover Branch	John J. Bingley	Henry Britcher	Hanover, Pa.
Hartford & New-Haven	John O. Chapman	F. Leppense	Hartford, Ct.
Hannibal & St. Joseph	H. A. Towne	H. C. Whiting	Hannibal, Mo.
Hartford, Providence & Fishkill	Edwin Garfield	V. D. Perry	Hartford, Ct.
Hackensack & New-York	Abra'm Angausen		Hackensack, N. J.
Hastings & Dakota	C. C. Clements		Hastings, Minn.
Housatonic	C. R. Morris	J Ferris	Bridgeport, Ct.
Houston & Texas Central	George Stevens	George Stevens	Houston, Texas.
Houghton & Ontonagon			L'Anse, Mich.
Houston Tap & Brazoria	A. Malsch	R. H. Yeomans	Houston, Texas.
Huntington & Broad-Top Mountain	D. G Gilchrist	M. Tellerhoof	Saxton, Pa.
Hempfield	T. Marsh		Wheeling, Va.
Houston & Great Northern	T. W. Shellhorn	T. W. Shellhorn.	Houston, Texas.

I

Indianapolis, Cincinnati & Lafayette			Cinncinati, Ohio.
Indianapolis, Peru & Chicago	John McKenna	John McKenna	Peru, Ind.
Illinois Central	†S. J. Hayes	H. O. Wadlie	Chicago, Ill.
Chicago Division	George Holton		Chicago, Ill.
South Division	David Oxley		Centralia, Ill.
North Division	J. B. Edams		Amboy, Ill
Iowa Division	Thomas W. Place		Waterloo, Iowa.
Iowa & Missouri State Line			Farmington,Iowa.
Iron	Perry Scott	Clem. Roetling	Ironton, Ohio.
Indianapolis & St. Louis	T. F. Sechler	C. E. Benton	Mattoon, Ill.
Indianapolis, Bloomington & Western	J. T. Otis	S. S. Smith	Urbana, Ill.
Ionia & Lansing	H. Loughlin		Lansing, Mich.

J

Jeffersonville, Madison & Indiana	Reuben Wells	John Higgins	Jeffersonville, Ind.
Jackson, Lansing & Saginaw	Andrew Wilson	A. Wilson	Jackson, Michigan

K

Keokuk & St. Paul	P. R. Sutton	Wm. McElroy	Keokuk, Iowa.
Knox & Lincoln			Bath, Maine.
Kentucky Central	J. R. Ledyard	J. L. Hackenthorn	Covington, Ky.
Knoxville & Charleston			Knoxville, Tenn.
Kansas Pacific	L. H. Waugh		Wyandotte, Kansas.
Kalamazoo, Allegan & Grand Rapids			Kalamazoo, Mich.
Kansas City, St. Joseph & Council Bluff	H. L. Cooper	H. L. Cooper	St. Joseph, Mo.

L

Lake Erie & Louisville	John Pero		Fremont, Ohio.
Lake Superior & Mississippi	W. McFarland	A .Coburn	St. Paul, Minn.
Lackawanna & Bloomsburg	Chas. Graham		Kingston, Pa.
Lehigh Valley	J. Kinsey.		South-Easton, Pa.
Lehigh Valley	P. Hofecker	E. R. Brown	Weatherly, Pa.
Lehigh Valley	A. Mitchell	Mauch Chunk, Pa.	Delano, Pa.
Lehigh Valley	D. Clark		Hazelton, Pa.
Lehigh & Susquehanna	L. C. Brastow	L. C. Brastow	Wilkesbarre, Pa.
Lehigh & Susquehanna	Wm. H. Brown		Mauch Chunk, Pa.
Leavenworth, Lawrence & Gal	S. M. Philbrick		Lawrence, Kansas.
Little Rock & Fort Smith			Little Rock, Ark.
Little Miami	J. H. Setchel.		Cincinnati, Ohio.
London & Port Stanley			London, C. W.
Louisville, New-Albany & Chicago	Jacob Losey	Jacob Losey	New-Albany, Ind.
Long Island	Chs. A. Thompson	B. T. Little	Hunter's Point, L I.
Louisville, Cincinnati & Lexington	John Skidmore	S. S. Pilson	Louisville, Ky.
Louisville & Nashville	Thatcher Perkins	Thatcher Perkins	Louisville, Ky.
Lake Shore & Michigan Southern	*James Sedgley	‡John Kirby	Cleveland, Ohio
Michigan Southern Division	William Hill		Elkhart, Ind.
" " "		S. S. Knapp.	Adrian, Mich.
Toledo Division	Geo. H. Tier	Frank O. Bray	Norwalk, Ohio.
Erie Division	L. O. Gassett	J. Withyecombe.	Cleveland Ohio.
Buffalo Division	B. H. Kidder	D. Sutherland	Buffalo, N. Y.

M

Marquette & Ontonagon	A. P. Burroughs	H. D. Lyons	Marquette, Mich.
Macon & Augusta			Macon, Ga.
Maine Central	J. W. Philbrick	J. W. Philbrick	Waterville, Me.
Macon & Western	D. M. Gogul	James A. Knight	Macon, Ga.
Manchester & Lawrence	Edward Studley	M. W. Dickerman.	Concord, N. H.
Macon & Brunswick	M. Thornton	M. Thornton	Macon, Ga.
Maysville & Lexington			Maysviille, Ky.
Marietta & Cincinnati	E. Bosley	E. Bosley	Chillicothe, Ohio.
Memphis, Clarksville & Louisville			Clarksville, Tenn.
Memphis & Little Rock	N. Greener	C. W. Wooldridge	Huntsville, Ark.
Memphis & Charleston	Michael Burk	A. W. Drew	Memphis, Tenn.
Memphis & Charleston	L. M. Sellars.	Fabien Varin	Huntsville, Ala.
Miami, Col. & Xenia	J. H. Setchel.	M. P. Ford	Cincinnati, Ohio.
Mineral Point	Robert Hay		Mineral Point, Wis.
Mississippi & Tennessee		Henry Teague	Memphis, Tenn
Mississippi Central	Henry Gibbon	John E. Becton	Water Valley, Miss.
Maryland & Delaware	Samuel Peters		Greensboro, Md

* General Master Mechanic. † Mechanical Superintendent.

‡ General Master Car-Builder.

Railroad.	*Master Mechanic.*	*Master Car-Builder.*	*Residence.*
Mississippi, Gains. & Tus			Gainsville, Ala.
Midland Pacific			Nebraska City, Neb.
Milwaukee & St. Paul	T. S. Davis	Wm. E. Kettridge	Milwaukee, Wis.
Milwaukee & St. Paul		John Baillie	Milwaukee, Wi
Milwaukee & St. Paul	J. Pattee	D. F. Wilson	Minneapolis, Minn.
Michigan Central	A. S. Sweet, Jr	J. B. Sutherland	Detroit, Mich
Montgomery & West-Point	J. McVey	W. H. Daniels	Montgomery Ala.
Montgomery & Eufaula	James McCann	I. E. Holmes	Montgomery, Ala.
Mobile & Montgomery	James McFarland	L. Barham	Montgomery, Ala.
Mobile & Girard	William Eyles	A. J. Nix	Girard, Ala.
Mobile & Ohio	L. J. Fleming	John McHugh	Mobile, Ala.
	B. S. Skates	B. S. Skates	Whistler, Ala.
Missouri River, Fort Scott & Gulf	John S. McCrum		Kansas City, Mo.
Missouri, Kansas & Texas	C. T. McIlvaney	J. Townsend	Sedalia, Mo.

N

Nashville & Chattanooga	John U. Eastman	J. G. Sawyer	Nashville, Tenn.
Nashville & Decatur	C. B. Knowles	C. B. Knowles	Nashville, Tenn.
New-Bedford & Taunton	Robert Chase	Robert Chase	New-Bedford, Mass.
New-Canaan			New-Canaan, Ct.
New-Brunswick & Canada	T. Armstrong	T. Armstrong	S'nt Andrew's N.B
New Haven & Northampton	Henry Fox	Henry Fox	Westfield, Mass.
New-York & Harlem	Wm. M. Strong	Leander Garey	New-York.
New-York Central & Hudson River	G. B. Van Vorst		Albany, N. Y.
New-York Central & Hudson River	Henry Watkeys		Syracuse, N Y.
New-York Central & Hudson River	Amos Gould		Rochester, N. Y.
New-York Central & Hudson River		Wm. Johnson	Buffalo, N. Y.
New-York Central & Hudson River	Wm. Buchanan	John McKenna	New-York.
New-York Central & Hudson River	John Dikeman		East-Albany, N. Y.
New-York Central & Hudson River		Joseph Jones	West-Albany, N. Y.
New-York Central & Hudson River	* C. T. Ham		Rochester, N. Y.
New-York & Oswego Midland	Wm. H. Griggs	Wm. H Griggs	Oswego, N. Y.
New-York, Providence & Boston	Jas. H. Anderson	Jas. H. Anderson	Providence. R. I.
New-York & New-Haven	H. Kittendorf	M. C. Andrews	New-Haven. Ct.
New-London Northern	J. W. Dow	S. W. Caulkins	New-London, Ct.
New-Jersey & Transportation Co	John Headden	David H. Baker	Jersey City. N. J.
New-Jersey Midland	J. E. Wiggins	J. E. Wiggins	Godwinsville, N J.
New-Jersey Southern	Rufus Blodgett		Manchester, N. J.
New-Haven & Derby			New-Haven, Ct.
New-Orleans, Opelousas & Gt. Western	John McCluskey	Matthew Nolan	Algiers, La.
New-Lisbon			Leetonia, Ohio.
New-Orleans & Ohio	John R. Jordan	John R. Jordan	Paducah, Ky.
New-Orleans, Jackson & Gt. Northern	John Conlon	Charles Bartine	New-Orleans, La.
New-Haven, Hartford & Springfield			Hartford, Ct.
Naugatuck		George W. Gray	Bridgeport, Ct.
Newark & Bloomfield	Luke F. Tronson		Hoboken, N. J.
Nova Scotia	W. Johnson		Bedford, N. S.
North-Carolina	Rufus D. Wade	B G. Sergeant	Co. Shops, N. C.
New-Orleans, Mobile & Texas	Josiah Bettis	Josiah Bettis	Mobile, Ala
Northern Central	C. M. Lewis		Baltimore, Md.
Northern Central		G. W. Demarest	York, Pa.
North-Lebanon		Henry B. Oves	Lebanon, Pa.
North-Pennsylvania	Franklin Roop	Franklin Roop	Philadelphia, Pa.
North-Eastern	D. W. Haines	A. M. Corrie	Florence, S C.
Northern	James W. Lander	Albert Langmaid	Concord, N. H.
Northern of New-Jersey	T. W. Demorest		New-York.
Norwich & Worcester	Richard Colburn	G. R. Bentley	Norwich, Ct.
Northern of Canada	James W. Forster		Toronto, Can.
Norfolk & Petersburg	J. S Whitworth	J. S. Whitworth	Norfolk, Va.
Northern Pacific		†Geo. W. Cushing	St. Paul, Minn.

O

Ogdensburg & Lake Champlain	William A. Short	J. R. Ames	Malone, N. Y.
Old Colony & Newport	J. K. Taylor	A. Gleason	Boston. Mass.
Orange, Alexandria & Manassas	James E. Waddy	John T. Nalls	Alexandria, Va.
Oil City & Pithole	George Thompson		Pithole, Pa.
Oil Creek & Alleghany River	J. S. McElroy	Jacob Williams	Corry, Pa.
Oil Creek & Alleghany	H.J.Bookhammer.	John Monks	Oil City, Pa.
Ohio & Mississlppi	F. J. Roth*	M.,Contant	Cochran, Ind.
Ohio & Mississippi	A. Thompson, East Division		Cochran, Ind.
Ohio & Mississippi	H. Elliott, West Division		East St. Louis, Ill.

P

Panama	Chas. E. Stewart	J. G. Wilson	Aspinwall, N. G.
Pacific of Missouri	E. B. Gibbs	E. B. Gibbs	St Louis, Mo.
Pennsylvania	†G. C. Gardner		Altoona, Pa.
Pennsylvania	H. D. Garrett	I. W. Van Houten	W. Philadelphia, Pa.
Pennsylvania	E. L Caum	Samuel W. Myers	Harrisburg, Pa.
Pennsylvania	G. W. Strattan	John P. Levan	Altoona, Pa.
Pennsylvania	D. O. Shaver	R. S. Ramsey	Pittsburg, Pa.
Philadelphia & Erie	Martin Walls	George J. Mason	Sunbury. Pa.
	W. L Foster	Robt M.Messimer	Renovo, Pa.
	W. L. Holman	Wm. P. Newcomb	Kane, Pa.
	W. T. Smith,	David Cowley	Erie, Pa.
Philadelphia, Wilmington & Baltimore	George W. Perry	George W. Perry	Wilmington, Del.
Philadelphia & Reading	L. B. Paxson	Aaron Steinbach	Reading, Pa.
Philadelphia, Germ'n & Norris'n	John Moyer	Nathan Pawling	Philadelphia, Pa.
Philadelphia & Baltimore Central	S. D. Danfield	SamuelD.Danfield	Chester, Pa.
Pittsburg, Cincinnati & St. Louis	James Ball	James Ball	Logansport, Ind.
	Robert Curtis	Theo. Chamberlain	Columbus, Ohio.
	Thomas Denmead		Dennison, Ohio.
	Thomas V. Losee	John Gottschall	Indianapolis, Ind.
		James McGee	Steubenville, Ohio.
Peoria & Rock Island	Theo. Mosher		Peoria, Ill.
Pittsburg, Fort Wayne & Chicago	S. M. Cummings	John Marquis	Alleghany, Pa.
Pittsburg, Fort Wayne & Chicago	J. M. Boon		Fort Wayne, Ind
Pittsburg & Connellsville	D. P. Rennie	J. M. Rutter	Connellsville, Pa.
Peoria, Pekin & Jacksonville	R. F. Hurd	R. F. Hurd	Pekin, Ill.
Peninsular	T. G. Templeton		Battle Creek, Mich
Portland & Rochester	Jas. S. Drake	Samuel Dean	Portland, Me.
Portland & Kennebec	John Ellis	J. W. Trussel	Augusta. Me.
Portland & Oxford Central	Geo. W. Battles	Geo. W. Battles	Buckfield, Me.
Portland, Saco & Portsmouth	John Donnell		Portland, Me.
Port Royal			Beaufort. S. C.
Port Hope, Lindsay & Beaverton	H. G Taylor	H. G. Taylor	Port Hope, Can.

* Mechanical Superintendent. † Superintendent of Motive Power and Machinery

Railroad.	*Master Mechanic.*	*Master Car-Builder.*	*Residence.*
Port Huron & Lake Michigan			Port Hur on, Mich.
Providence, Warren & Bristol	Rufus Smith	J. Brightman	Bristol, R. I.
Portsmouth, Gt. Falls & Monmouth	James Tucker	E. Fall	Union Village, N.H.
Petersburg	R. B. Adams	Alex. Wright	Petersburg, Va.
Providence & Worcester	Joseph Kelly	Olney L. Smith	Providence, R. I.
Poughkeepsie & Eastern	John L. Driscoll	John L. Driscoll	Poughkeepsie, N. Y.

R

Raleigh & Gaston	J. B. Gayle	J. B. Gayle	Raleigh, N. C.
Rensselaer & Saratoga	W. B. Gage		Troy, N. Y.
Richmond, Fredericksburg & Potomac	H. Kuhn	W. H. Trainham	Richmond, Va.
Richmond Danville & Piedmont	John McFarland	H. Longest	Richmond, Va.
Richmond & Petersburg	John O'Brien	J. J. Martin	Richmond, Va.
Richmond & York River			Richmond, Va.
Rome, Watertown & Ogdensburg	Wm. Jackson	H. H. Sessions	Rome, N. Y.
Reading & Columbia	B. Van Lew		Columbia, Pa.
Rome, Georgia	O. W. Harbin	O. W. Harbin	Rome, Ga.
Rochester & Genesee Valley	M. E. Brown	M. Wilder	Buffalo, N. Y.
Rockford, Rock Island & St. Louis	R. D. Grant		Beardstown, Ill.
Rutland	N. L. Davis	N. B. Allen	Rutland, Vt.

S

San Francisco & San José	R. B. Bishop	Frank Bellisle	San Francisco, Cal.
St. Croix & Lake Superior			New-York City.
St. Croix & Penobscot	Edward Bolton	A G. Page	Milltown, Me.
St. Lawrence & Ottawa	Calvin Dame	Calvin Dame	Prescott, Canada.
St. Louis & Iron Mountain	O. A. Haines	Oscar Doolittle	Carondelet, Mo.
Sandusky, Mans. & Newark		Charles Scoeby	Sandusky, Ohio.
St. Joseph & Denver City	E. Sleppy		Elwood, Kan.
San Antonio & Mexican Gulf	W. T. Bingham		Victoria, Texas.
South Side of Long Island			New-York.
St. Paul & Sioux City	Jas. G. Butterfield		Shakopee, Minn.
St. Louis, Vandalia, T. Haute & Ind.	C. R. Peddle	H. Kermise	Terre Haute, Ind.
South-Carolina	W. B. Smith	John Reed	Charleston, S. C.
South-Side of Virginia	J. T. Robinett	J. T. Robinett	Petersburg, Va.
South & North-Alabama	Tho. Jeffries	Tho. Jeffries	Lime Station, Ala.
Southern Central	C. G. Brown		Auburn, N. Y.
Southern Minnesota	Wm. Lininger		Wells, Minn.
Southern of Canada	Albert Congdon	Albert Congdon	Fort Erie.
South-Western of Georgia	C. D. Wall		Columbus, Ga.
South-Western of Georgia	D. M.Gogul	James A. Knight	Macon, Ga.
South Shore	Warren E. Ray		Cohasset, Mass.
Stanstead, Shefford & Chambly	W. H. Smith	M. Sessions	Waterloo, C. E.
Schuylkill & Susquehanna	John E. Wootten	John E. Wootten	Reading, Pa.
Seaboard & Roanoke	J. B. Pendleton	J. B. Pendleton	Portsmouth, Va.
Stonington & Providence	J. H. Anderson	J. H. Anderson	Providence, R. I.
Selma & Gulf	Wm. T. Daughtrey		Selma, Ala.
Selma, Rome & Dalton	A. G. Maynes	W. W. Peirce	Selma, Ala.
Sioux City & Pacific	Charles Foster	J. R. Dow	Missouri Val., Iowa.
Spartanburg & Union	J. N. Benner	Jacob Rice	Union C. H., S. C.
Sheboygan & Fond du Lac	J. H. Erwin	J. H. Erwin	Sheboygan, Wis.
Sullivan & Erie			Tonawanda, Pa.
Syracuse & Binghamton, N. Y	B. G. Merrill	B. G. Merrill	Syracuse, N. Y.
Sycamore & Cortland			Sycamore, Ill.
St. Louis & South-Eastern		C. B. Salisbury	Mt. Vernon. Ill.
St. Louis, Kansas City & Northern	John Calhoun	C. S. Buck	St. Louis, Mo.

T

Taunton Branch			Taunton, Mass.
Tioga	Peres Bonny	D. H. Stratton	Blossburg, Pa
Texas & New-Orleans	R. B. Baer		Houston, Texas.
Tennessee & Pacific	William McKeand.	William McKeand.	Nashville, Tenn.
Toledo, Wabash & Western	W. F. Ray		Fort Wayne, Ind.
Toledo, Wabash & Western		David Hoit	Toledo, Ohio.
	T. G. Gorman		Springfield, Ohio.
Toledo, Peoria & Warsaw	A. H. De Clerq	R. M. Hemphill	Peoria, Ill.
Troy & Boston	Foster Church	R. V. Coon	Troy, N. Y.
Toronto	Grey & Bruce		Toronto, Can.

U

Union Pacific	I. H. Congdon	Geo. E. Stevens	Omaha, Nebraska.
Utica & Black River	John Bailey.	David James	Utica, N. Y.
Utica, Chenango & Susquehanna	C. H. Brown		Utica, N. Y.

V

Virginia & Tennessee	F. Sterk	W. A. Morgan	Lynchburg, Va.
Vicksburg & Meridian	Jas. B. Brown		Vicksburg, Miss.
Vineland			Vineland, N. J.
Vermont Central	J. M. Foss	Milton Sessions	St. Albans, Vt.
Vermont & Massachusetts	D. T. Davis	Jacob Marsh	Fitchburg, Mass.

W

Wicomico & Pocomoke			Berlin, Md.
Wilmington, Charlotte & Rutherford	W. A. Gill	Thomas Myers	Laurenburg, N. C.
Wilmington, Columbia & Augusta	George Hall	W. J. Calais	Wilmington, N. C.
Westchester & Philadelphia	John Moyer	N. Pawling	Philadelphia, Pa.
Wilmington & Weldon	John Bissit	John Bissit	Wilmington, N. C.
West-Jersey	W. McAllister	C. C. Williams	Camden, N. J.
Western Maryland	R. V. Dohoney	J. H. Nussear	Union Bridge, Md.
Winona & St. Peter	F. C. Ford	H. L. Preston	Winona, Minn
Western North-Carolina	E. H. Marsh	E. H. Marsh	Salisbury, N. C.
Western R. R. N. C	M. W. Atkinson	M. W. Atkinson	Fayetteville, N. C.
West-Feliciana	R. C. Brower		Woodville, Miss.
Western & Atlantic	John H. Flynn	John Sherman	Atlanta, Ga.
Worcester & Nashua	George H Griggs	George H. Griggs	Worcester, Mass.
Welland	William Wells	William Pay	St. Catharine, C. W.
Washington & Ohio	Nathaniel Hayes	Joshua Hamson	Alexandria, Va.

It is reported that recently a train was thrown from the track on the San Joaquin Valley Railroad in California by a drift of sand which the wind had blown upon the track. It is said that in some places the sand was a foot deep over the rails.

The machine-shops and master mechanic's office of the Southern Minnesota Railroad have been removed from Hokah, Minn., to Wells, of the same State.

Refined nickel is worth $3 a pound. The ore is found in Pennsylvania and Missouri. The Pennsylvania mines furnish the principal supply at present, and are said to be very profitable.

The tunnel of the Baltimore and Potomac Railroad 1550 feet long under the southern part of Capitol Hill was completed on the 13th ult. Cars will soon be running over the road between Washington and Baltimore.

A narrow-gauge railroad convention will be held in St. Louis on the 19th of June. Arrangements have been made to secure the attendance of those most largely interested in, and most familiar with, the narrow-gauge theory, and it is expected that important results will come from the meeting.

The Pittsburg Locomotive-Works are to be enlarged to a capacity for six or more engines per month.

Car Manufacturers.

Allison, W. C. & Sons	Philadelphia, Pa.
Anderson, J. R. & Co	Richmond, Va.
Altoona Manufacturing Co	Altoona. Pa.
Adrian Car Co	Adrian, Mich.
Atlantic Car Works	Salem, Mass.
Barney & Smith Manufacturing Co	Dayton, Ohio.
Baker, Jackson & Co	Latrobe, Pa.
Billmeyer & Smalls	York, Pa.
Bradley, Osgood	Worcester, Mass.
Brill, J. G. & Son	Philadelphia, Pa.
Bitner, George W	Pittsburg, Pa.
Buffalo Car Co	Buffalo, N. Y.
Cambridge City Car Co	Cambridge City, Ind
Canada Steam-Engine Co	Kingston, Canada.
Central Car & Manufacturing Co	Jackson, Mich.
Clendenning, W. W	Montreal.
Cummings Car-Works	Jersey City, N. J.
Connellsville Machine and Car Co	Connellsville, Pa.
Detroit Car and Manufacturing Co	Detroit, Mich.
Dawson Manufacturing Co	Dawson, Ga.
Dickey, Neill & Co	Toronto.
Dickson Manufacturing Co	Scranton, Pa.
Erie Car-Works	Erie, Pa.
Elmira Car-Works	Elmira, N. Y.
Fredericks & Co	Catasauqua, Pa.
Fremont Car Co	Fremont, Ohio.
Gardner, F. & Co.	Carlisle, Pa.
Gill, John L	Columbus, Ohio.
Gilbert, Bush & Co	Troy, N. Y.
Goold, James & Co	Albany, N. Y.
Goodrich Car Co	Augusta, Ga.
Haskell & Barker	Michigan City, Ind.
Harrisburg Car Manufacturing Co	Harrisburg, Pa.
Heathcote, Herbst & Co	Glen Rock, Pa.
Hamilton, William & Son	Toronto.
Harlan & Hollingsworth Co	Wilmington, Del.
Highspire Cooperative Car Co	Highspire, Pa.
Jackson & Sharp Co	Wilmington, Del.
Jackson & Woodin	Berwick, Pa.
Jones, J. M. & Co	West-Troy, N. Y.
Kimball Manufacturing Co	San Francisco, Cal.
Keith, H. T. & I. N	W. Sandwich, Mass.
Lombard, Thomas	Augusta, Me.
Lebanon Manufacturing Co	Lebanon, Pa.
Louisville Car-Wheel & Railway Supply Co	Louisville, Ky.
Lehigh Car Manufacturing Co	Stemton, Pa.
Stephenson, John & Co	New-York, N. Y.
Michigan Car Co	Detroit, Mich.
McNairy, Claflen & Co	Cleveland, Ohio
Murray, Dougall & Co	Milton, Pa.
McVey, Walker & Co	Braddock's Field, Pa.
Mowry Car and Wheel Works	Cincinnati, O.
Middletown Car & Manufacturing Co	Middletown, Pa.
Missouri Car and Foundry Co	St. Louis, Mo.
New-Haven Car Co	New-Haven, Ct.
Niblo, James M	Conshohocken, Pa.
Ohio Falls Car Co	Jeffersonville, Ind.
Ontario Car Co	London, Ont.
Peabody & McDonald	Calais, Me.
Peters, Simon	Quebec.
Pittsburg and McKeesport Car Co	McKeesport, Pa.
Pittsburg Car and Locomotive Co	Pittsburg, Pa.
Portland Co	Portland, Me.
Pullman Car Co	Chicago.
Peregoy, J. H	Houston, Texas.
Quealy, W. J	Hannibal, Mo.
Ranlet Car Manufacturing Co	Laconia, N. H.
Russell & Co	Massillon, Ohio.
Sands, William L	Pottstown, Pa.
Schall, Michael	York, Pa.
Shaaber, W	Reading, Pa.
Southern Car-Works	Independence, La.
Shoenberger & Bryant	Duluth, Minn.
Smith, Dawson & Baily	Pittsburg, Pa.
Seath & Hager	Terre Haute, Ind.
Taunton Car Co	Taunton, Mass
Tredegar Co	Richmond, Va.
Tiffin Car-Works	Tiffin, Ohio.
Vigo Foundry and Terre Haute Car-Works	Terre Haute, Ind.
Wharton, Thomas J	Brunswick, Ga.
Whittaker, Phillips & Co	Toledo, Ohio.
Wason Manufacturing Co	Springfield, Mass.
Weimer, P L & Bros	Lebanon, Pa.
Wyoming Valley Manufacturing Co	Wilkesbarre, Pa.
Wells, French & Co	Chicago, Ill.

Car-Wheel Manufacturers.

Albany Car-Wheel Works	Albany, N. Y.
Atlantic Iron-Works	Portsmouth, Va.
Baltimore Car-Wheel Foundry Co	Baltimore, Md.
Barnum & Richardson Manufacturing Co	Chicago, Ill.
Barney & Smith Manufacturing Co.	Dayton, Ohio.
Bass & Hanna	Fort Wayne, Ind.
Bailey, Howson & Co	St. Paul, Minn.
Davenport, Fairbairn & Co	Erie, Pa.
Dawson Manufacturing Co	Dawson, Ga.
Detroit Car-Wheel Works	Detroit, Mich.
Fulton Foundry Co	Cleveland, Ohio.
Gill & Bidwell	Allegheny City, Pa.
Green, D. P. & Co	St. Louis, Mo.
Harrisburg Car Manufacturing Co	Harrisburg, Pa.
Jackson & Woodin	Berwick, Pa.
John L. Gill	Columbus, Ohio.
Lobdell Car-Wheel Works	Wilmington, Del.
Missouri Car and Foundry Co	St. Louis, Mo.
Moore Elastic Car-Wheel Co	Jersey City, N. J.
Mowry Car and Wheel Works	Cincinnati, Ohio.
Ohio Falls Car Co	Jeffersonville, Ind.
Pettengill, Glass & Co	Cleveland, Ohio.
Quealey, W. J	Hannibal, Mo.
Ramapo Wheel & Foundry Co	Ramapo, N. Y.
Scoville, J. & N. C	Buffalo, N. Y.
St. Louis Car-Wheel Co	St. Louis, Mo.
Taylor Iron Works	High Bridge, N. J.
Thompson, Douglas	Bordentown, N. J.
Tredegar Company	Richmond, Va.
Toronto Car-Wheel Co	Toronto, Can.
Washburn, Hunts & Co	Jersey City, N. J.
Washburn Car-Wheel Manufacturing Co	Worcester, Mass.
Wason Manufacturing Co	Springfield, Mass.
Whitney & Sons	Philadelphia, Pa.
Woodbury & Company	E. Cambr'ge, Mass.
Wyoming Valley Manufacturing Co	Wilkesbarre, Pa.

Locomotive Builders.

Baldwin Locomotive Works	Philadelphia, Pa.
Brooks Locomotive Works	Dunkirk, N. Y.
Danforth & Cooke	Paterson, N. J.
Dickson Manufacturing Co	Scranton, Pa.
Grant Locomotive Works	Paterson, N. J.
Hinckley & Williams	Boston, Mass.
Manchester Locomotive Works	Manchester, N. H.
Mason, William	Taunton, Mass.
McKay Iron and Locomotive Works	Jersey City, N. J.
Portland Company	Portland, Me.
Porter, Bell & Co. (light locomotives)	Pittsburgh, Pa.
Pittsburg Locomotive Works	Pittsburg, Pa.
Rogers Locomotive Works	Paterson, N. J.
Rhode Island Locomotive Works	Providence R. I.
Schenectady Locomotive Works	Schenectady, N. Y.
Smith, Dawson & Baily (light locomotives)	Pittsburg, Pa.
Taunton Locomotive Works	Taunton, Mass.

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WORKS—On Watson, Hamilton, and Lake Streets.

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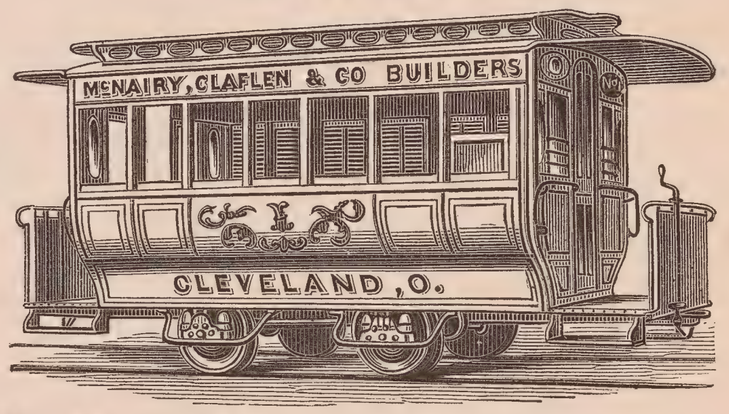

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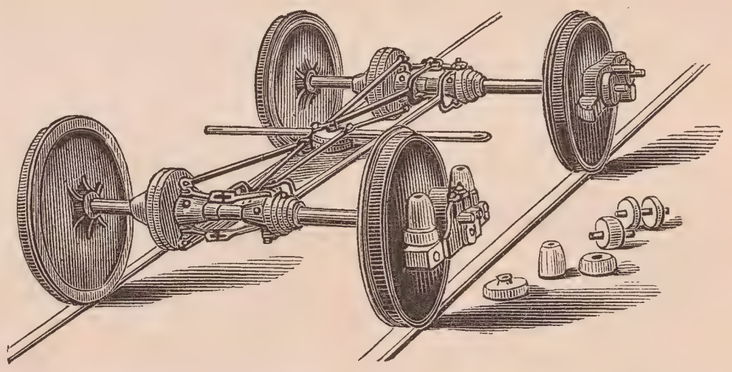

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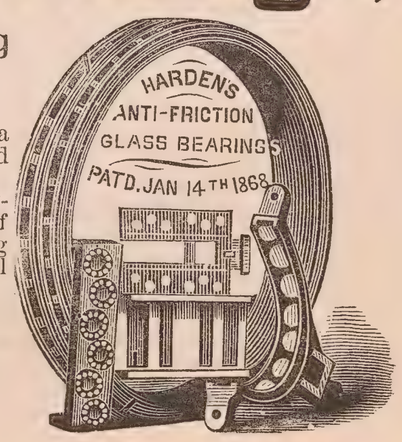
In sending orders for Glass, please be explicit in giving the dimensions (length, breadth and thickness) of Cross-Heads, Gibbs of Cross-Heads, and other working parts, and for all Circular Bearings, the Diameter. Full printed instructions will be sent as to the manner of putting in the glass with each set ordered.



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Capacity, Six Cars per Day.

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The Company are prepared to build FREIGHT CARS of every description, and to supply Frogs, and all kinds of Railway Castings, Bridge Bolts, and Wrought Work. Particular attention given to fitting Frogs and Crossings in a thoroughly workmanlike manner.

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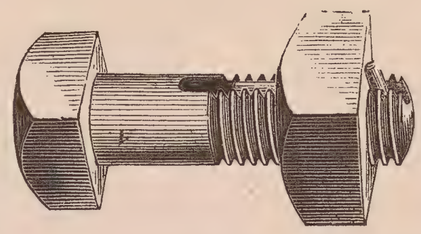
Manufacturers of all kinds of BOLTS, for FISH-PLATES, CARS, BRIDGES, MACHINERY, CARRIAGES, &c., with the

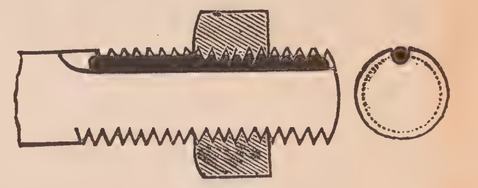


"CUMMING NUT-LOCK,"

Patented

June 16, 1868,

August 23, 1870.



SECTIONS.

Unequaled for CHEAPNESS, SIMPLICITY & EFFECTIVENESS.

This simple device, as will be seen by the engravings, consists of a groove being cut in the threaded part of a screw bolt into which is placed a key of copper wire, or other soft metal; when the nut is screwed on, it cuts a thread on the key, thereby making it impossible for the key to get out until the nut is taken off. When the nut is screwed up to its place, that part of the key over which the nut has passed is riveted up against the nut with a small punch, destroying the thread on the key. The nut, therefore, can not move backward until force is used, as with a wrench.

The groove can be rapidly cut with a simple machine designed for the purpose.

Experience has proved this device absolutely reliable, and it is the cheapest of all known devices for the purpose. By its use, old bolts on which the nuts have become too slack for use can be made as good as new, making it a great saving to railroad companies and others in that item alone. It is cheaper than a check-nut.

If the bolt should become slack from shrinking of timber or other causes, *the nut will always remain firmly attached to the bolt*, and, with the wrench, can be screwed up *any distance*, and the wire riveted up any number of times, or can be taken off without injury to the nut or bolt.

This is the only method in use that locks the nut firmly to the bolt without regard to place or surroundings, all others require some attachment that holds the bolt in its position, and a washer or other attachment to keep the nut from turning.

DIRECTIONS FOR USE.—Place the copper key in the slot, pointed end out, and beveled side up, in such a position that when the nut is screwed to its place about three-eighths of an inch of the key will project beyond its outer face. Then screw the nut to its place *over the key*, allowing it to cut its own thread in the copper. Then take a narrow flat set punch, and rivet the projecting part of the key *solidly* against the outer face of the nut. To tighten the nut: screw it up, and rivet the key tighter. To remove the nut: simply apply the wrench and unscrew the nut. It will cut its own way out through the copper. The same key can be used several times, by moving it outward a few threads in the slot.

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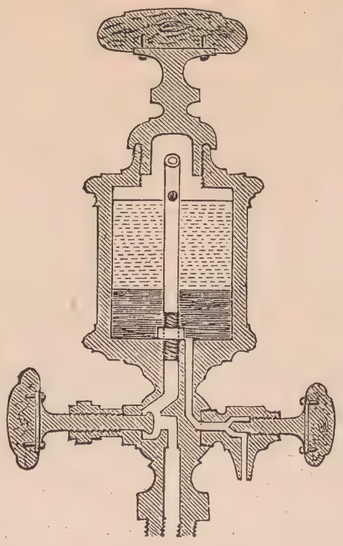

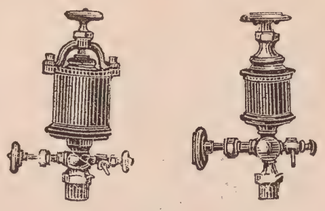

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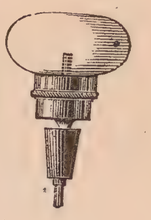

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These Oil Cups have a wide renown for their reliability and economy, which makes them the favorite with every Engineer and Mechanic who has them in use. They are made in different styles and sizes, but all work on the great principle of a free and perfectly automatic action on the bearing, and only when the machinery is in motion.

We call particular attention to our

SELF-ACTING LUBRICATORS FOR CYLINDERS.

Their advantages over other lubricators are so striking that it is only a question of time for them to come in general use, their accuracy in keeping the valves and pistons thoroughly and constantly lubricated being unequaled.

The principle of working is based on an intermittent condensation of steam in the *upper part* of the cup containing the lubricant. At every couple of strokes the steam, condensing, produces a drop of water, which, being heavier then the oil, sinks by its own gravity and raises a corresponding drop of oil over into a tube, which arises in the centre of the cup and conveys said oil directly to the chest and cylinder, this tube being the only connection from the lubricator to the internal part of the engine. The water produced by the condensation is drawn off once a day by a side-cock, and the cup filled again with the lubricant. Another advantage is, that the condensing process refines the oil, as the water settling down through the lubricant carries down salts and acids which may be contained therein. In this way corrosion of the steam-chest and cylinder is prevented, the power of the engine improved, and an amount of packing saved.

These lubricators have been adopted on ***thousands*** of stationary and marine engines, steam-pumps, steam fire-engines, and on locomotives by over ***eighty railroads*** in the United States.

Send for a circular and sample, for which no charge unless approved of.

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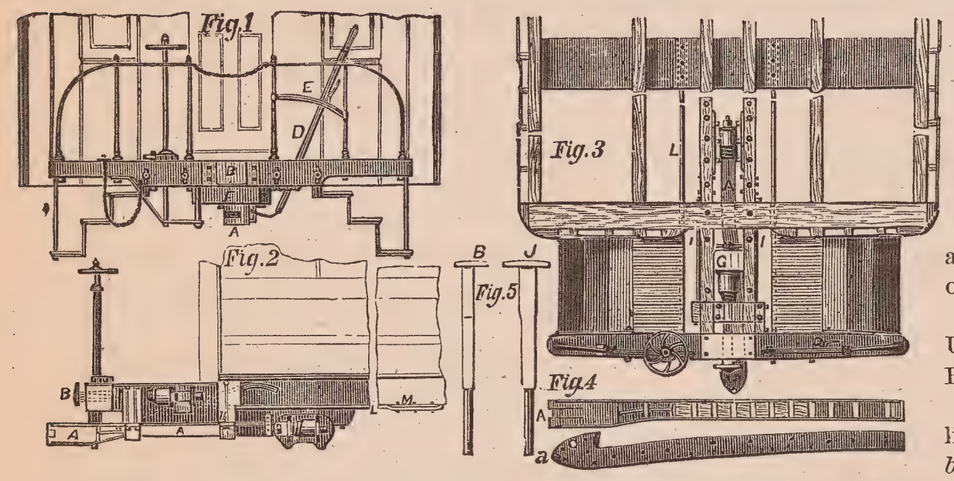

Office, 231 Broadway, (Rooms 4 and 5,) New-York.

Send for Illustrated Pamphlet, and call and see working models. E. MILLER, Patentee.

DESCRIPTION.

Figure 1 is an elevation; Figure 2, a longitudinal section; Figure 3, a plan of an end of a car to which the arrangement has been applied: and Figures 4 and 5 show top and side views of the "Hook" and "Buffer," drawn on a larger scale than that of Figures 1, 2, and 3.

The letters refer to the same parts in all the figures. A is the coupling "Hook," B the "Buffer," C the "Stop," D the "Lever," E the "Quadrant Ratchet," F the "Truss Beam," G the "Spring Beam," H the "Suspender Beam," I the "Upward Trusses," K the "Main Spring," L the "Downward Trusses," and M the "Bolster."

The Platforms, instead of being located below the centre line of the main sills of the cars, are placed *in* that line, and held there by the Trusses I and L, so that the point of contact (in Buffers B) is *in* the said centre line and *not below* it.

The coupling "Hook" A is attached to the draw spring the same as the ordinary draw head, and at the same height above the track, but in such a manner that the outer end is free to move aterally for a short distance. The Coupling Hook projects beyond the platform. The Stop C is placed under the Buffer Beam to prevent accidental uncoupling. When two cars are brought ogether, the Coupling Hooks, from *their shape*, push each other aside, until the Buffers B are compressed hard on the Buffer Springs, then—*the points of the hooks having passed each other sufficiently far*—the Hooks are carried forward by their main-springs, and thus the "*Coupling*" and "*Compression*" are both effected automatically *and at the same time*, and without the use of links and pins. When two cars are thus coupled together, the *head* of the *Hook* of each car is under the Buffer Beam of its opposite car, and the platforms are close together, (about 4 inches apart.) The effect of this is, *one platform can not be forced over the other*, nor can a *child* fall between the platforms; the dust and rain are nearly all shut out; the "Compression" makes the train run steadily, and prevents all jerking at starting and stopping.

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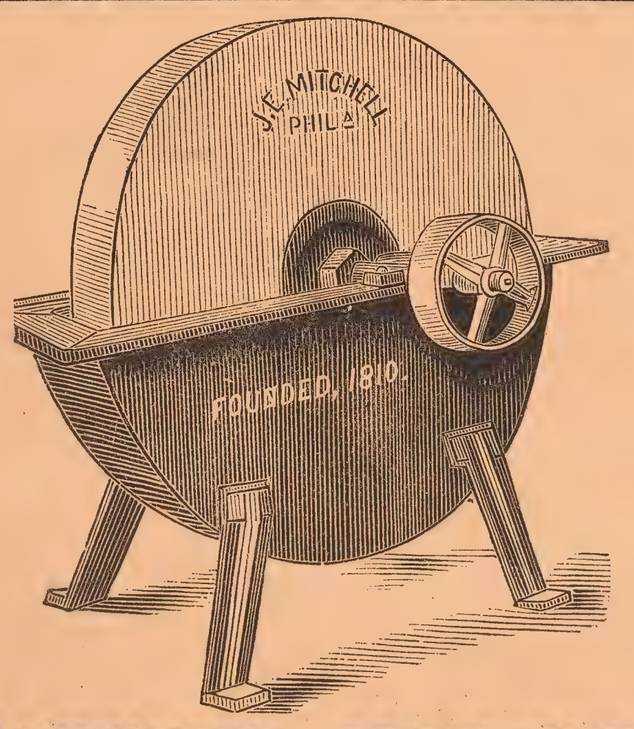

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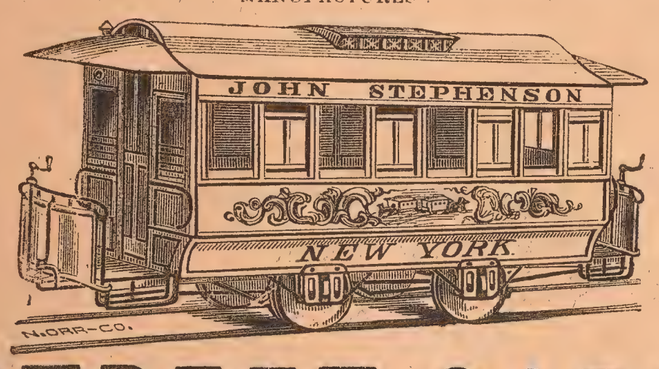

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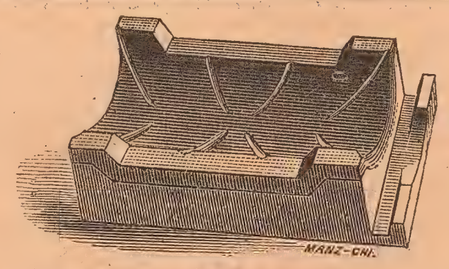

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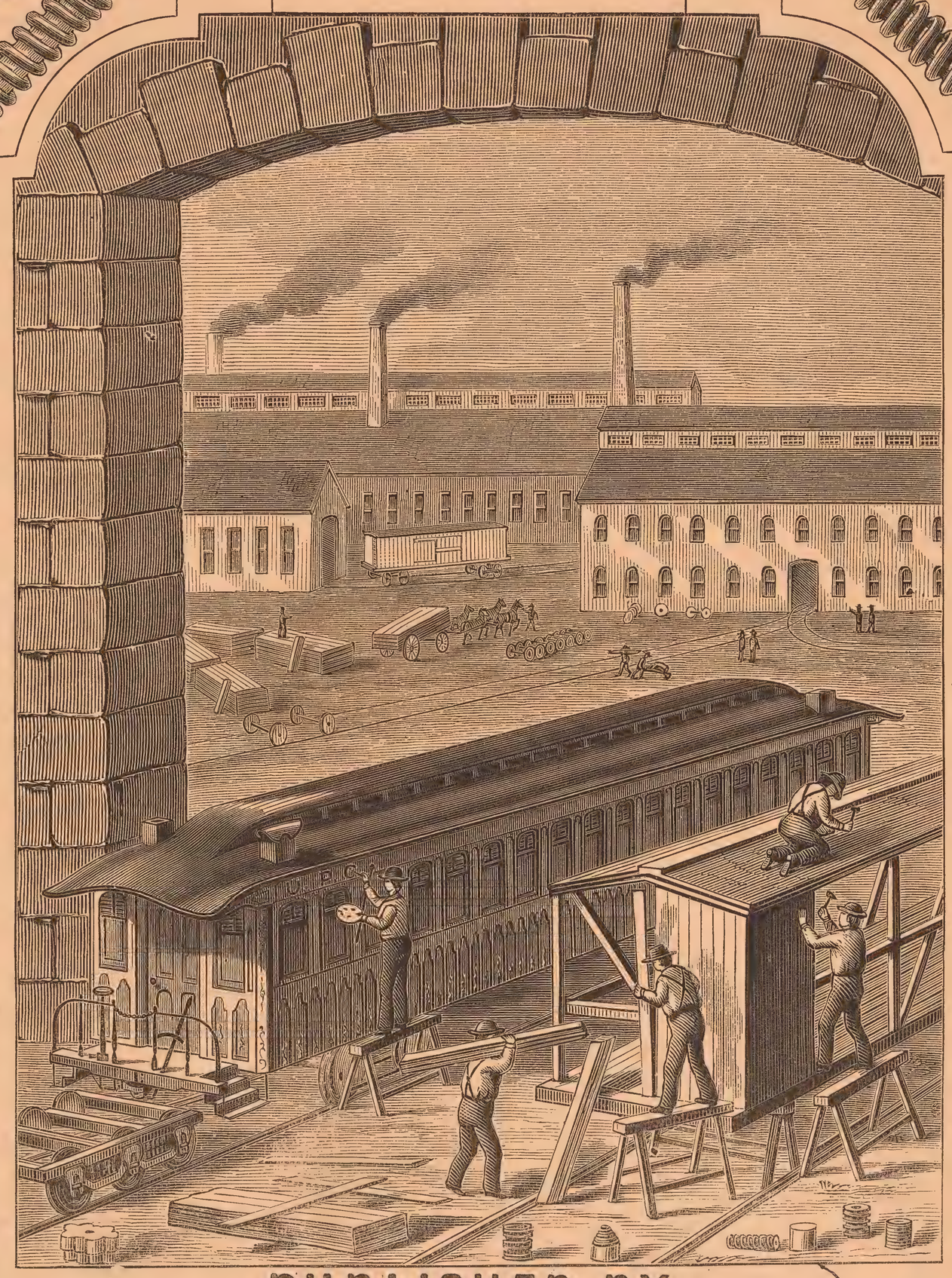

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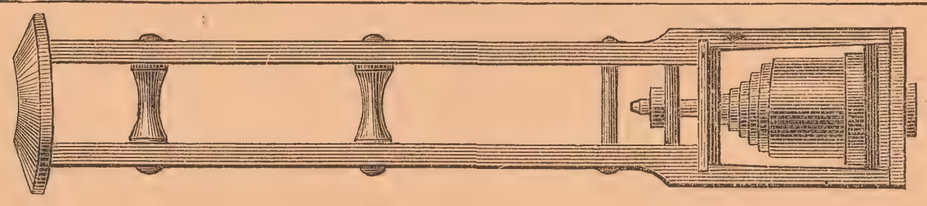

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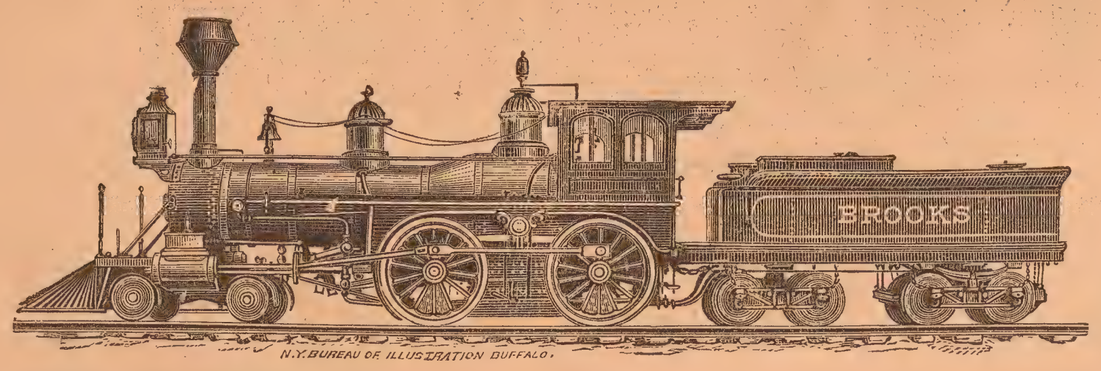

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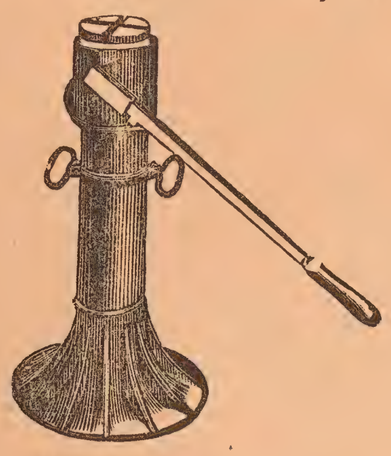

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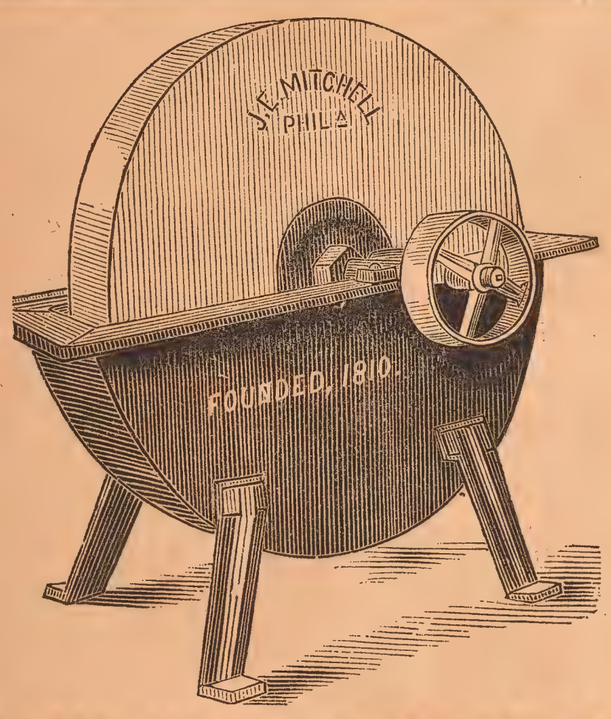

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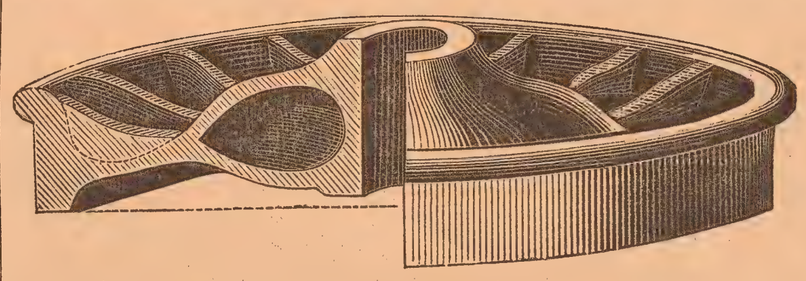

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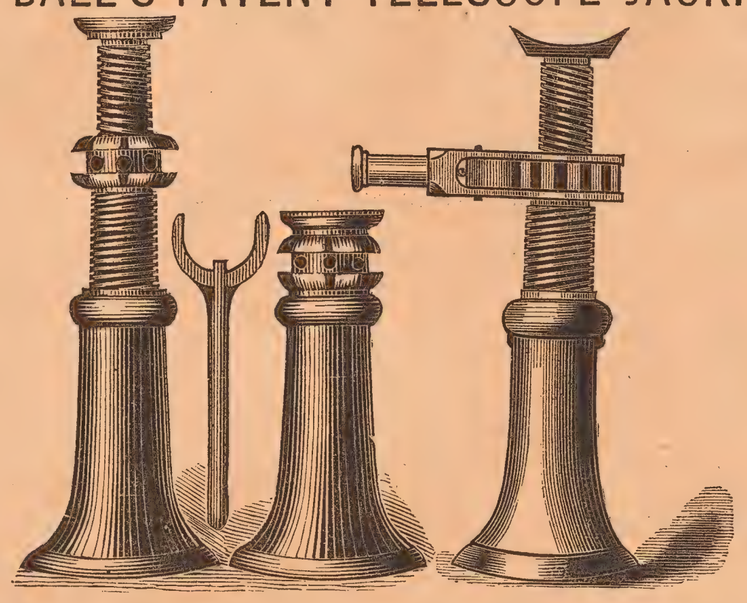

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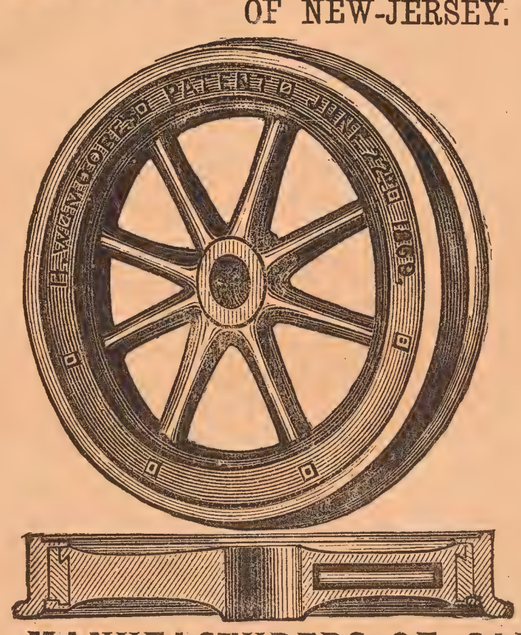

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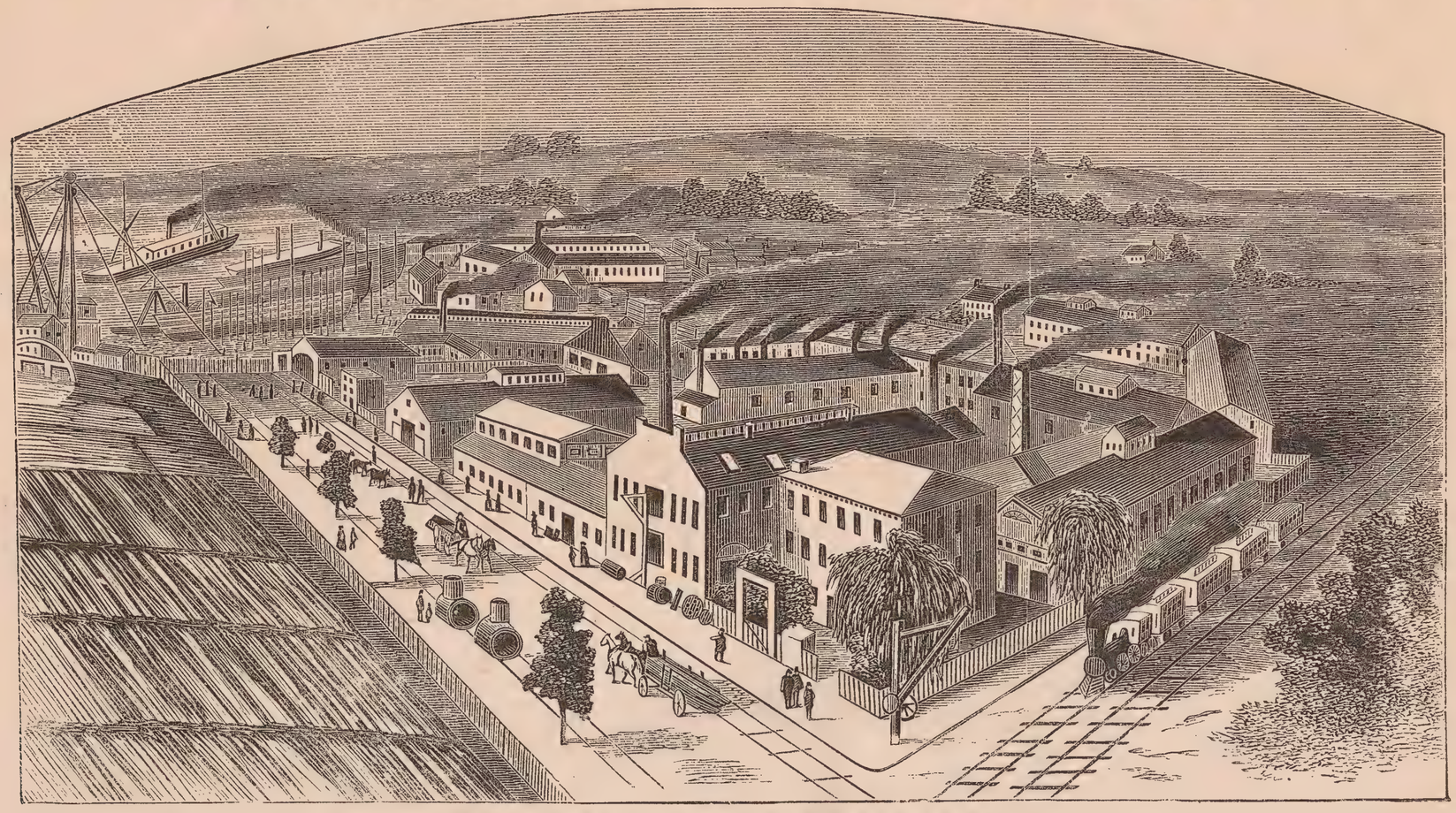

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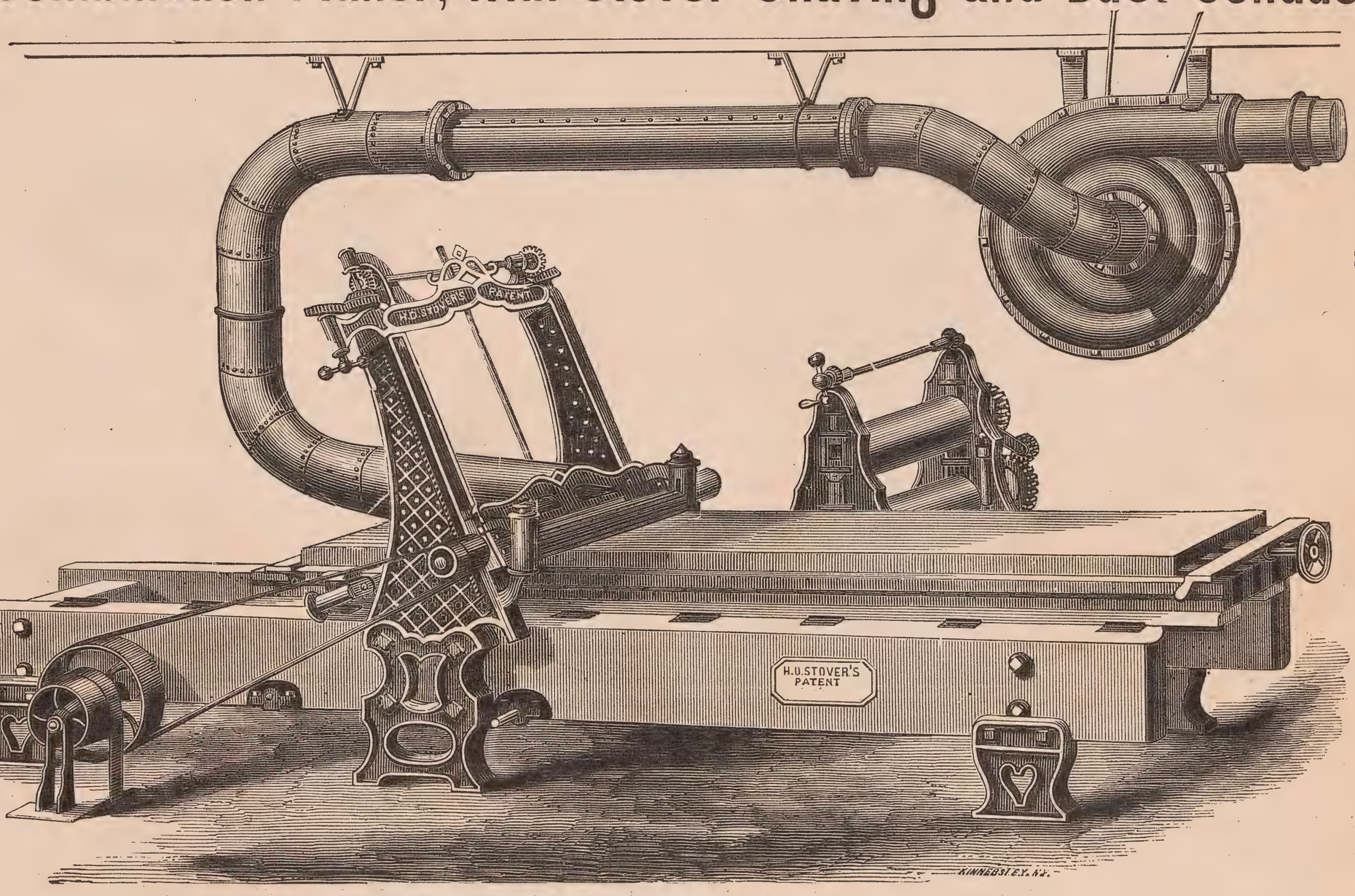

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This may certify that we have had in operation some four weeks one of the Stover Planing Machines for working wood. It gives me pleasure to say that it has given the best of satisfaction, doing the work of both the Daniels' and Woodworth Planers, and in a very superior manner, and turns out more than double the work of the Daniels' Machine, without having to be constantly sharpening the cutters.

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Office of the Thomas Iron Works, HOKENDAUQUA, Pa., May 4, 1870.

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Yours very truly,

JOHN THOMAS, General Superintendent Thomas Iron Works.

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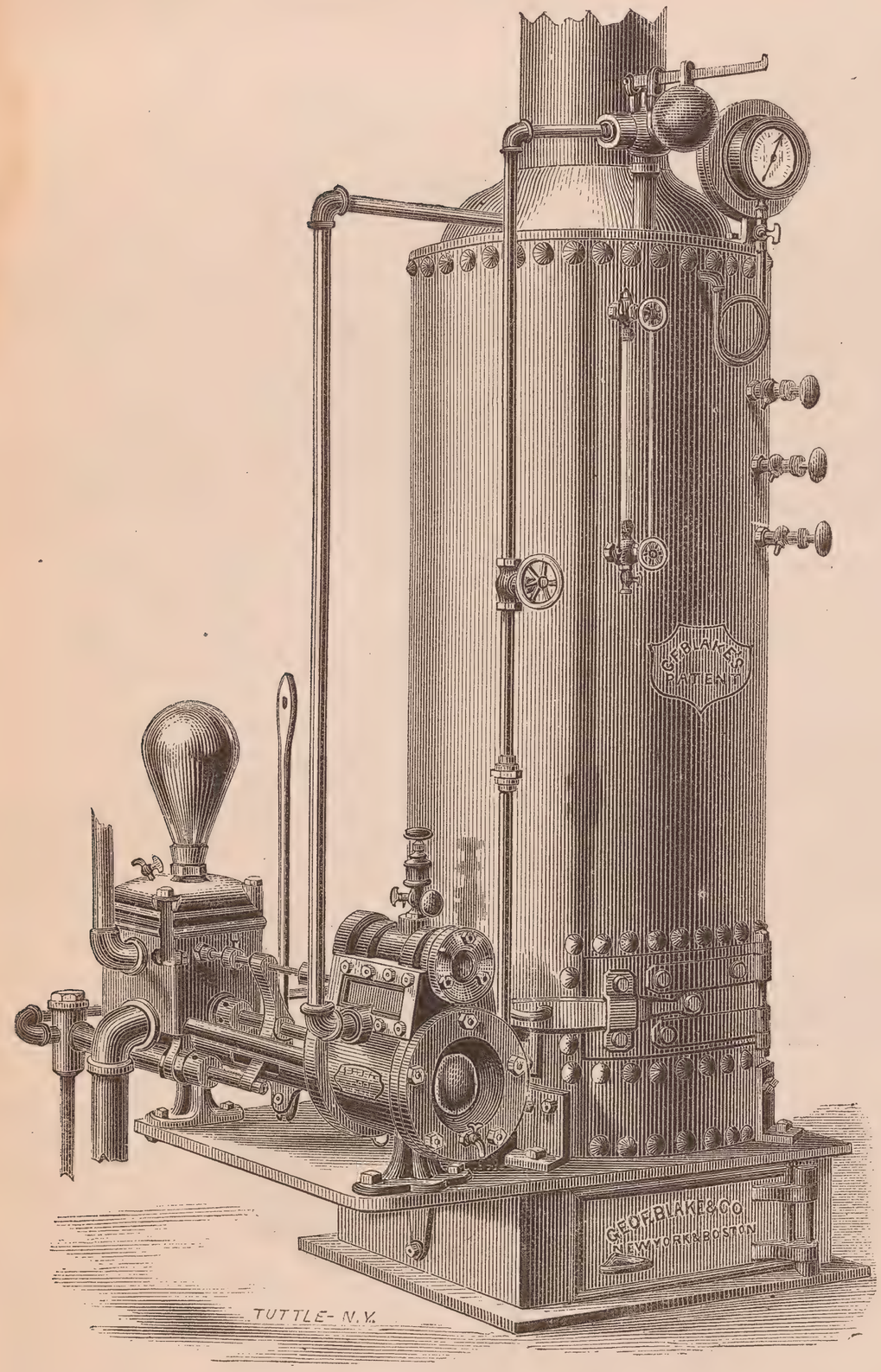

[Cut represents TANK PUMP, size "B," with oiler-feed and *Hand-power* attachments.]

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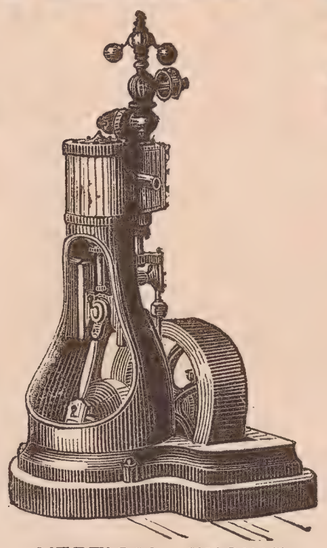
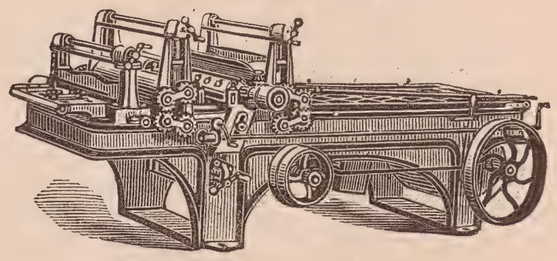
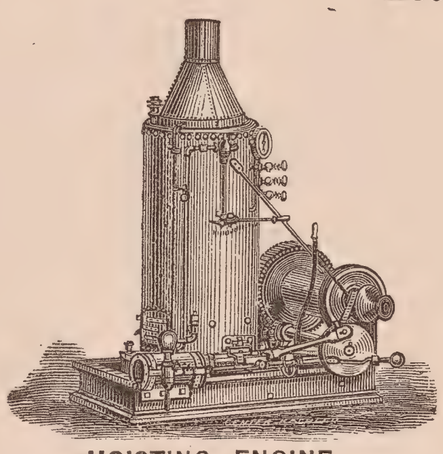


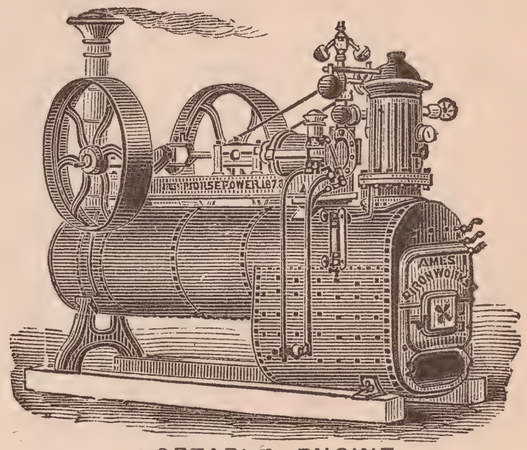
VERTICAL ENGINE.



WOODWORTH PLANER.



HOISTING ENGINE.



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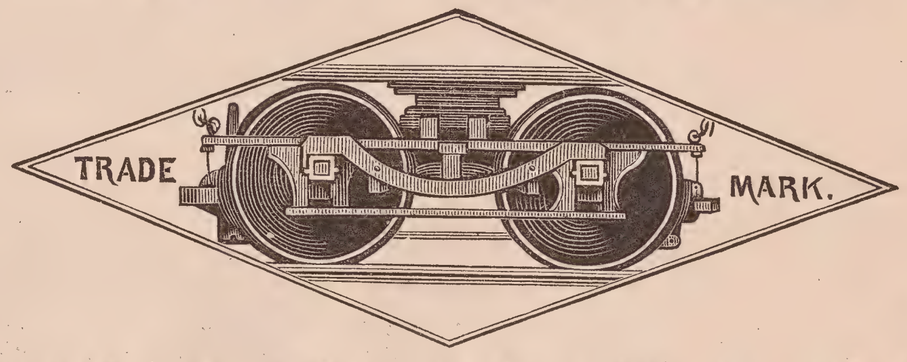

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THE NATIONAL CAR BUILDER.

DEVOTED TO THE INTERESTS OF RAILWAY ROLLING STOCK.

Vol. II. No. 12. JUNE, 1872. *50 Cents per Annum. Single Copies, 10 Cents.*

Luxurious Traveling.

THE May number of *Harper's Monthly Magazine* contains a finely illustrated article descriptive of a trip to California over the Union Pacific Railroad, from which we are permitted to make the following extracts:

"Moreover, until you have taken this journey, you will never know how great a difference it makes to your comfort whether your train goes at the rate of forty or at twenty-two miles per hour. This last is the pace of the iron horse between Omaha and San Francisco; and it is to the fierce and rapid rush of an Eastern lightning express what a gentle and easy amble is to a rough and jolting trot. It would not be surprising to find that the overland journey will, by and by, create a public opinion in favor of what New-Yorkers would call slow trains. Certainly a lightning express rushing through from Chicago to San Francisco would not carry any one, except an express-man, a second time. At thirty-five or forty miles per hour the country you pass through is a blur; one hardly sees between the telegraph-poles; pleasure and ease are alike out of question; reading tires your eyes, writing is impossible, conversation impracticable except at the auctioneer pitch, and the motion is wearing and tiresome. But at twenty-two miles per hour travel by rail is a different affair; and having unpacked your books and unstrapped your wraps in your Pullman or Central Pacific palace car, you may pursue all the sedentary avocations and amusements of a parlor at home; and as your housekeeping is done—and admirably done—for you by alert and experienced servants; as you may lie down at full length or sit up, sleep or wake, at your choice; as your dinner is sure to be abundant, very tolerably cooked, and not hurried; as you are pretty sure to make acquaintances on the car; and as the country through which you pass is strange, and abounds in curious and interesting sights, and the air is fresh and exhilarating—you soon fall into the ways of the voyage; and if you are a tired business man, or a wearied housekeeper, your careless ease will be such a rest as certainly most busy and overworked Americans know how to enjoy.

"You write very comfortably at a table in a little room, called a drawing-room, entirely closed off, if you wish it, from the remainder of the car, which room contains two large and comfortable arm-chairs and a sofa, two broad, clean, plate-glass windows on each side, which may be doubled if the weather is cold, hooks in abundance for shawls, hats, etc., and mirrors at every corner. Books and photographs lie on the table; your wife sits at the window, sewing and looking out on long ranges of snow-clad mountains, or on boundless ocean-like plains; children play on the floor, or watch at the windows for the comical prairie-dogs sitting near their holes, and turning laughable somersaults as the car sweeps by. You converse as you would in your parlor at home; the noise of the train is as much lost to your consciousness as the steamship's rush through the waters; the air is pure, for these cars are thoroughly ventilated; the heating apparatus used seems to me quite perfect, for it keeps the feet warm, and diffuses an agreeable and equal heat through all parts of the car. This is accomplished by means of hot-water pipes fastened near the floor.

"From Chicago to Omaha your train will carry a dining-car, which is a great curiosity in its way. I expected to find this somewhat greasy, a little untidy, and with a smell of the kitchen. It might, we travelers thought, be a convenience, but it could not be a luxury. But in fact it is as neat, as nicely fitted, as trim and cleanly, as though Delmonico had furnished it; and though the kitchen may be in the forward end of the car, so perfect is the ventilation that there is not even the faintest odor of cooking. You sit at little tables which comfortably accommodate four persons; you order your breakfast, dinner, or supper from a bill of fare which, as you will see below, contains a quite surprising number of dishes, and you eat from snow-white linen and neat dishes admirably cooked food, and pay a moderate price.

"Beyond Omaha, unless you have taken seats in a hotel-car, you eat at stations placed at proper distances apart, where abundant provision is made, and the food is, for the most part, both well cooked and well served. These hotel stations are under the supervision and control of the managers of the roads, and at many of them, especially on the Central Pacific road—in California, that is to say—your meals are served with actual elegance. Sufficient time is allowed—from thirty to thirty-five minutes—to eat; the conductor tells you beforehand that a bell will be rung five minutes before the train starts, and we always found him obliging enough to look in and tell the ladies to take their time, as he would not leave them.

"There is a pleasant spice of variety and adventure in getting out by the way side at the eating stations. We saw strange faces, we had time to look about us, the occasional Indian delighted the children, we stretched our legs, and saw something of our fellow-passengers in the other cars. Moreover, if you have a numerous party desirous to eat together, the porter will telegraph ahead for you to have a sufficient number of seats reserved; and thus you take your places without flurry or haste, and do not have your digestion spoiled by preliminary and vexatious thoughts about pushing for a good place. In short, these trains are managed for the pleasure and accommodation of the passengers. The voyage would, I suppose, be unendurable else.

"The sleeping-car, but for which the journey to the Pacific by rail would be extremely uncomfortable, but by whose help it is made a pleasure-trip, owes its development and perfection to Mr. George M. Pullman, who is the inventor and patentee of most of the ingenious devices by which the traveler's comfort is secured in these cars. Of course he is an American. He began life poor; was once a miner in Colorado, and was, I believe, so poor when he began the experiment of his sleeping-cars that it was with great difficulty he raised the means to build his first car. He is now president of the Pullman Car Company, which has five hundred sleeping, drawing-room, and hotel-cars on different railroads, and is building more, at the rate of three finished cars for every week of the present year. The company are also building a new kind of day-cars, to be put on such short routes as that between New-York and Washington; and by the time you are reading this it will run a daily hotel-car from Chicago to Ogden, in which you may sit and sleep, and have your meals served at any time you may choose to order them. It is planning, and will fit up this year near Chicago, extensive car-works of its own on grounds large enough to contain also the cottages of the thousand workmen who will be there employed; and it is said that these grounds are to be planned with special regard to the convenience of the men and their families. The company has already found it expedient to keep and furnish, near the depots in all the great cities, rooms where conductors and porters may, at the end of a journey, bathe, change their clothes, make out their reports, and read, write, or amuse themselves. Mr. Pullman thinks that as he requires much from his men, and as they are picked men, trained with care, it is an advantage to the company to furnish them such a home at the ends of the great routes of travel, where they may make themselves comfortable and at ease. Certainly it is a humane thought, and likely, besides, to give him the command of responsible servants.

"The Pullman cars are constantly improving. The Russian Grand Duke traveled last winter in perhaps the most commodious and perfect manner in which any one ever traveled by rail. He had in one train a day-car, in which he and his companions could sit at ease, read, write, or amuse themselves as in a parlor; a dining or hotel-car, into which they walked to breakfast or dinner; and a sleeping-car. No doubt the impressions he got of this kind of pleasure-traveling will facilitate Mr. Pullman's entrance into Russia, where, as well as in England, Germany, and France, the Pullman Company will within two years have placed their cars, as arrangements are now making for that purpose.

"The superiority of the American sleeping-cars is in their cleanliness, the perfection of their heating and ventilating contrivances, and the presence of every thing which can make a car convenient to live in. There is nothing like them in Europe, and all European travelers in this country have been surprised and delighted with them. The Pullman Company is successful, as it deserves to be. It now runs cars on nearly one hundred roads, the railroad companies generally owning one half the stock of the cars they use, and thus having a mutual interest. The Pullman Company sells to the public what the railroad company in such cases does not furnish—the sleeping-car accommodations. You may now ride in Pullman cars over sixty thousand miles of railroad. The Pullman Company already employs over two thousand persons, and in its new car-shops will employ one thousand

more; and all this vast business has grown from the smallest beginnings.

"One of the pleasantest ways to travel across the continent, though not, I think, the way in which you will see most of the people, is to make the journey with a party of friends numerous enough to fill, or nearly fill, a car. To show you at what cost—exclusive of the regular railroad fare—such a company may journey, I give you here some extracts from a little book issued for the information of travelers by the company:

"'For a regular sleeping-car, containing twelve open sections of two double berths each, and two state-rooms of two double berths each, (in all twenty-eight berths,) with conductor and porter, seventy-five dollars per day.

"'For a drawing-room car, containing two drawing-rooms, having each a sofa and two large easy-chairs by day, and making up at night into two double and two single berths, three state-rooms, having each two double berths, and six open sections of two double berths each, (in all twenty-six berths,) with conductor and porter, seventy-five dollars per day.

"'For a hotel-car, containing two drawing-rooms, as above described, one state-room, having two double berths, and six open sections of two double berths each, (in all twenty-two berths,) and having also, in one end, a kitchen fully equipped with every thing necessary for cooking and serving meals, with conductor, cook, and two waiters, eighty-five dollars per day.'

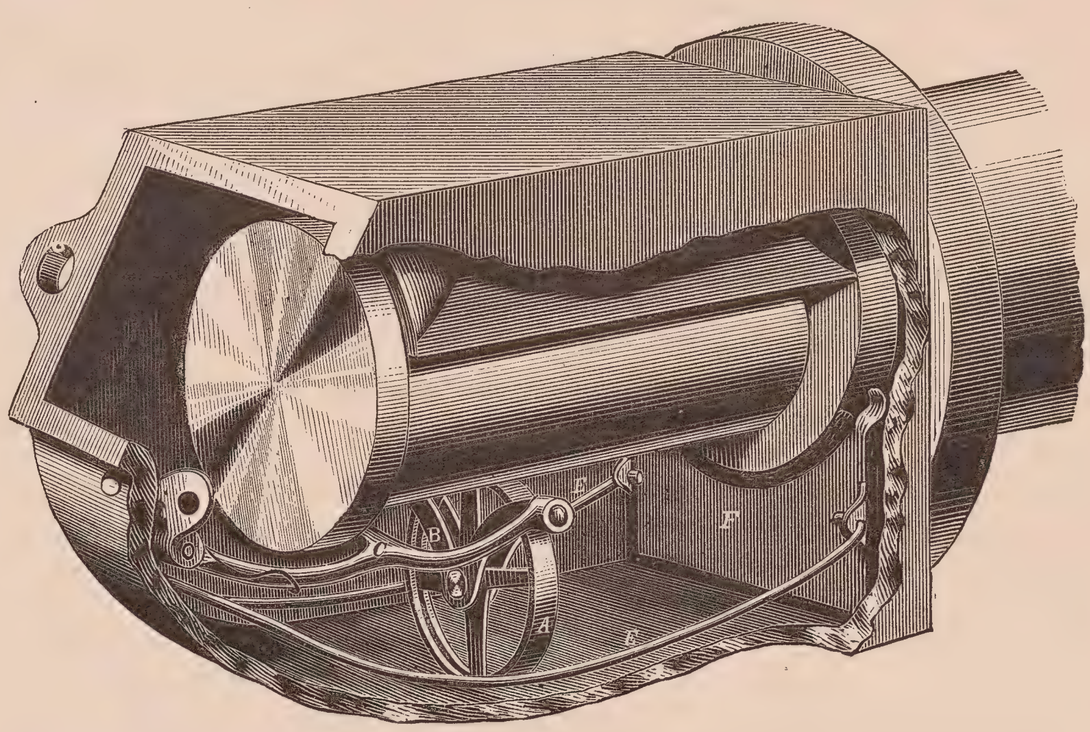
"The Pullman hotel-car is one of the most ingenious, as well as one of the most convenient, of all modern arrangements for travel. It can seat forty persons at the tables; it contains not only a kitchen—which is a marvel of compactness, having a sink, with hot and cold water faucets, and every 'modern convenience'—but a wine-closet, a china-closet, a linen-closet, and provision-lockers so spacious as to contain supplies for thirty people all the way from Chicago to the Pacific, if necessary; its commissary list contains, as I ascertained by actual count, 133 different articles of food; it carries 1000 napkins, 150 table-cloths, 300 hand-towels, and 30 or 40 roller-towels, besides sheets, pillow-cases, etc., etc. And unless you are of an investigating turn, you would never know that the car contained even a kitchen.

"Whenever a sleeping-car arrives at the end of a journey, it is laid over for twenty-four hours. Thereupon the porter gathers up the soiled linen for the laundry, and a force of men and women enter the car and take out of it bedding, carpets, and every movable thing; all are beaten with rods and hung up to air; and meantime the whole car is aired, and the wood-work dusted, rubbed, and scrubbed in the most thorough manner. This is the manner of their housekeeping."

Cooling and Ventilating Railway Cars.

THE ventilation and cooling of railway cars during our hot summer days, is a matter of quite as much importance as the warming of them in winter. Little has been done to provide these desiderata in any appreciable degree, and the welfare of the traveling public requires that attention should be called to the subject until reform is inaugurated. Claiming as we do to be the most inventive people in the world, and the foremost in the rapidity of railway extension, it is by no means to the credit of our projectors and engineers that schemes of at least apparent utility should be brought out and applied abroad before the adoption of any thing of a practical character on American railroads. Perhaps from these, notably from one now in use in the East-Indies, some hints may be gathered from which schemes appropriate to the railways of this country may be evolved.

In the apparatus referred to, an air-chamber is provided under the floor of the car, and has valves at either end, to be opened, one or the other, according as the car is moving in one direction or another. Above the chamber is a peculiar cellular structure, kept moist from a reservoir carried on the car, and through which the air is caused to circulate on its passage from the chamber to the car interior. This provides for the cooling of the air, and the cleansing of the same from dust, and also for its admission to the car by the forward motion thereof. To provide for the exit of warm or vitiated air, the windows are made to open horizontally, so as to be placed at an angle to the side of the car, the position being capable of reversal according to the direction of the movement of the car. The speed of the train causes the air in front of the inclined window surface to deflect it in a current, which, as will be easily comprehended, draws out the air from the car by means of the partial vacuum created behind such window. With a car constructed on the principle thus roughly sketched, there is a reduction of temperature of about fifteen degrees, with an evaporation of six gallons of water per hour in the cooling devices. In one instance, under peculiar conditions, and with an excessive evaporation, the diminution of heat amounted to thirty degrees. Of course, the item of expense may be assumed as considerable, and this may stand in the way of the adoption of the plan on ordinary cars, but should not be allowed to do so as concerns the palace-cars, upon which so much is lavished even in many things of far less consequence than that to which we have here briefly called attention.—*American Artisan.*



Sanson's Patent Car-Axle Lubricator.

THE lubricating device illustrated in the accompanying engraving is intended more particularly for railway axles, and is designed not only to insure a perfectly uniform and continuous supply of the lubricant to the journal when in motion, but to provide against waste of the material by leakage or oozing between the inner end of the journal and the adjacent and surrounding surface of the box. It will be seen that, in the working of the device, the oil placed in the bottom of the box is carried up to the axle by a wheel A, arranged below and in contact with the axle, and with its lower edge dipping into the lubricant. The wheel A has its pivot in stirrup-pieces B, which have pivotal connection with the forked end of a lever-arm C, swinging on a fulcrum at the end of the box, and pressed upward by a spring to keep the wheel in constant and elastic contact with the axle. To prevent the spread of the oil from the axle at the inner end of the box, a pad-block F is pressed up by a spring E against the usual annular flanch on the axle. By this construction of the apparatus it can be applied to axle-boxes of ordinary construction, without necessitating the slightest change in the boxes; the method of attaching the wheel A to its bearings permitting it to turn and be moved to its place through the outer end of the box. The attachment of the pivotal or fulcrum bearing of the lever-arm C to the end of the box is very readily accomplished by the aid of a drill stock and a couple of rivets or small bolts. It is evident, therefore, that the time required for applying the lubricator to the axle-boxes of a train is so slight as to cause practically no delay in its use, and no parts are in danger of being jarred out of place or injured in the ordinary exigencies of railway usage.

The action of the wheel as an oil-conveyor has been thoroughly tested, is in use at present, works well and with certainty, furnishing a copious and constant supply of oil to the journal, proportionate to the speed of the train, until all of the lubricant is entirely used up, and requiring no further attention than to replenish the oil when exhausted. In 1869, this car-axle lubricator was first tested, and was then a roller working upon spring bearings in vertical guides attached to a plate or frame; but this, although working well, required the making of new and suitable boxes for each axle, with removable bottoms. This was too expensive, and railroad men well know that bolting a bottom to the box is in itself defective, and, however well done, will soon loosen from the shocks of a car in motion, and allow the lubricant to escape; therefore the device, as now improved, is simple, inexpensive, and durable, and requires no alteration to be made to the box to receive it, but can be inserted and attached to any of the boxes now running in a few minutes, without detention to cars. A thorough trial of this improvement shows that fully three fourths of the expense incurred for lubrication with the methods now in general use can be saved, in addition to the benefits to be derived from a more reliable system.

For further information, address Charles Mettam, 395 Canal street, New-York.

The New Chicago.

ALREADY, says the *North-western Review*, the business of the past is being rapidly reëstablished, and before the close of the present year our principal streets devoted to commerce will be re-located. Market street is now a more important business locality than ever before, and Lake street entirely rebuilt from Lasalle to the lake midsummer, with a better class of business stores than before the fire, while it is also expected that by that time there will be a front of nearly three miles of five or six-story brick, stone, and iron buildings within the burnt district, of the most costly character. The disasters of October have not impaired the financial strength of our moneyed institutions, and the banks of our city are reported stronger than ever before. Foreign capital is seeking investment freely here, and Chicago's greatness as a commercial centre is still impressed upon the capitalists of the world.

THE Thorntown Car and Manufacturing Company filed articles of association with the Secretary of State of Indiana on the 25th ult. The object of said association is announced to be the manufacture of all kinds of railroad, road, and other carriages, carts, wagons, sleighs, and farming implements, locomotives and other engines, steam-boilers, and general foundry and machine and switch work in wrought and cast metals.

Car-Shop Notes.

CAR-WORKS AT WORCESTER, MASS.

The car-works of Mr. Osgood Bradley, Sen., are located at this place. His name, as well as that of the place itself, will always have a peculiar interest for railroad men from the fact that both are identified with the building of the first railway cars in the United States. Mr. Bradley is still living, a hale old man, with apparently as much vitality as many a young man of less than half his years. His sons, who now attend to the greater part of the business, can remember when the first cars were turned out and hauled to Boston by teams. They were, in reality, only coach-bodies, several of them being put together to form a car. The influence of this first system of building is still seen in the cars constructed at this place, and extends, in a greater or less degree, to every car-shop in the eastern part of Mas-achusetts.

The passenger-cars constructed according to the best judgment of Mr. Bradley's firm have only two sills, 5 by 8 inches, of Southern pine. Cross-sills, 2½ by 8 inches, are then put in 18 inches apart. These are held in place by four rows of bridging driven in between them, and are claimed to be as strong to resist a blow on the end of a car as an equal number of sills. This can hardly be the case, however, no matter how well the bridging is placed. The disadvantages of this method of construction will be strikingly apparent upon examination of one of these cars which has, in the event of an accident, been dragged any distance upon the road-bed. The breaking strain, in such a case, comes crosswise the timber. Long sills do not, under the same circumstances, receive as severe blows as they slide over obstructions. The practice in this establishment is to put in six iron carlines, each 1½ by ⅝ inches. This is somewhat less than the quantity of metal usually employed. The truss-plank is fastened to the posts by wood-screws, number 20, about 4 inches long. No lag-screws are used in the posts. The posts are 2¾ by 1¾ inches. There are usually four truss-rods, 1⅛ inches in diameter. The truss-plank is about the usual size, 2½ by 12 inches. It would be a great improvement, as it strikes us, if a 15 or 16-inch plank, somewhat less than the ordinary thickness, could be used in all cars.

At the time of our visit, a baggage and postal-car, built at the establishment, was in the shops for repairs. Three weeks before, it had been thrown from the track, landing upon its roof. It was soon repaired, however, losing only a trip or two. Two weeks afterward it met with another mishap rather more serious than the first one, being again thrown from the track, and, without upsetting, was whirled end for end, and landed nearly as far forward as the engine. Though racked and shaken, it could be easily put in repair, and may last the usual time. This is a good illustration of the fact that the car-builder never knows to what test his work may be subjected.

The establishment of Mr. Bradley employs about 120 men. Though badly crowded, and lacking the required space to handle work to advantage, the shops are well managed, and turn out a large quantity of construction and repair work of an excellent quality.

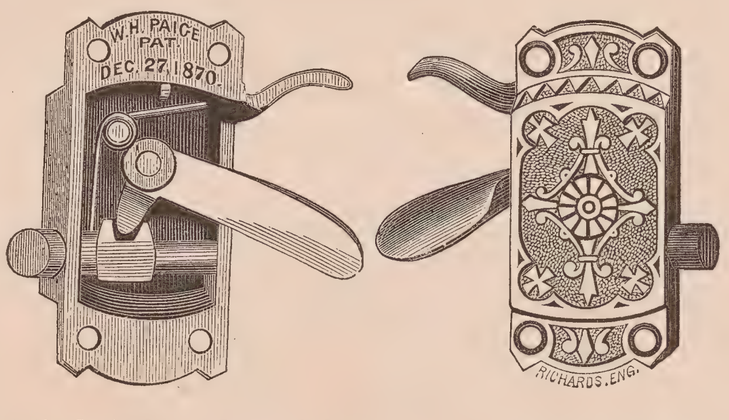
THE WASON MANUFACTURING COMPANY.

In a future article we intend to give a detailed description of the new works which this well-known company are now putting up at Springfield, and which, when completed, will add largely to their capacity for building cars of every class. The new shops will not only afford ample space and every incidental convenience resulting therefrom, but will embody many desirable improvements suggested by long experience, and the requirements of a steadily increasing business.

The old shops have become quite inadequate for turning out with economy and dispatch the work which accumulates, although the car department is capable of building from 15 to 18 passenger-cars and 100 freight-cars per month. The usual average of passenger-cars, however, has been from 12 to 14 per month. The foundry department is now turning out about 25 tons of iron per day, including 60 car-wheels.

Mr. Paige, the superintendent, has recently designed a new car-lamp, intended to burn either the mineral sperm, or the more common, dangerous oil. While possessing the well-known advantages of the student lamp, it has also some novel features which will render it very valuable in railway cars. It is so arranged that a sudden movement of the car will extinguish the flame. This sensitiveness to motion is under perfect control, and in fixing the lamp up it may be arranged so as to go out at a slight jar, or it may be set so as to require a shock like the overturning of the car to extinguish it. Swinging of the car for a certain distance beyond the perpendicular also puts it out. Another advantage is the one already named, that it will burn the mineral sperm, which is as safe against explosion, or other accident, as the regular sperm-oil or candles.

Mr. Paige has also devised another improvement which railway travelers can not fail to appreciate. It is a sash-fixture, an illustration of which we here insert. The motion is positive in both directions, and



entirely independent of the spring, should that happen to give out. This is the Wason standard fixture, and is put on all their work, unless orders are to the contrary. It has the advantages of being strong, conveniently fitted to the hand, and decidedly handsome, especially when got up in bronze.

In our inspection of the works of this company, we were greatly aided by the kind attentions of Mr. Fisk, the president, and of Mr. Paige, the superintendent; and we hope in a future number of the CAR-BUILDER to give a more particular and detailed account of many features of the establishment, and of the work it turns out.

CONNECTICUT RIVER R. R. SHOPS.

The shops of this road are small, but well arranged for the work they have to do. In looking through them, the results are everywhere apparent of the ingenuity and skill of the master car-builder, Mr. R. Hitchcock. Many of the wood-working machines are of his design and construction. They are handy and efficient, and have been made with comparative moderate expense. In passenger and baggage-cars, Mr. Hitchcock uses an iron carline, 2 by ¾ inches, with a timber bolted upon one side only. By giving the irons less crook at the triangular sill of the deck, they are brought up on the outside so that the sill is scarcely cut at all, and almost the entire strength of the timber retained.

The sill of his baggage-car doors is prolonged inside the car, forming a long shoe which holds the whole bottom of the door. The shoe, rising as it goes inward, conducts the water that may find its way into it down to the sill, where notches cast in the outer side carry it off. In pedestal boxes and bearings, there seems a great deal to be learned. Even at the expense of increasing the weight of the pedestals several pounds, it seems worth while to try a movable jaw-face.

Mr. Hitchcock invented a face for this purpose, very simple, easily changed when worn, and cheap. The Passumsic road is now using it, we believe. It appears to be a very good thing. In some shops, the pedestal straps are flat bars put side up, and are often working loose as they are exposed to the concussions in the direction of least strength. A round rod is also used, with flat ends. Some builders twist the flat strap so that the centre is edge up while the ends are flat. This is probably one of the best methods of strengthening the strap, and it is also the least expensive.

Did we dare to touch upon the hackneyed topic of ventilation, we should have something to say about Mr. Hitchcock's well-known ventilator; but we forbear, as we suspect our readers are tired of the subject.

N. WASHBURN'S STEEL-TIRE WORKS, WORCESTER, MASS.

A good deal of interest is manifested, in a quiet way, among railroad men on the subject of steel tires for car-wheels; and some information in regard to their manufacture, obtained by a visit to these works, may not be uninteresting to our readers. The wheel consists of a cast-steel tire with a cast-iron centre welded in. The welding of cast-iron to steel is no new thing, anvils and shears having been made by the process long since. The difficulty of applying it to wheels consisted in the tendency of the two metals to separate at the weld when contracting or expanding. Without having much faith in the experiment, Mr. Washburn attempted, some two years since, to weld a cast-iron centre into a steel tire, and produced a wheel that perhaps no one except an expert would consider imperfect. Not a flaw is visible in it as it stands in the shop to-day. This first wheel was a proof of the practicability of the undertaking.

The first step in the process of manufacture is the casting of the ingot from which the tire is made. It is conical in form, 8 or 9 inches thick, and about 2 feet in diameter, and has a large hole through the centre. As soon as they come from the mould, they are heated in a furnace and then put under a steam-hammer, which decreases their thickness, enlarges their diameter, and condenses the metal. At this stage any imperfections are easily detected. The ingot, or tire, as it may now be called, is then taken to the rough-rolls, where it receives nearly its final form under the combined power of a large engine and hydraulic press acting upon the rolls. Before and after going into these rolls the tire is heated; it is then taken to the finishing-rolls, which give it its proper size and thickness. It is then put on to a peculiarly constructed screw-press, which gives it a perfectly circular form. A stream of water is then thrown upon every part of the tread by a hose-pipe, the effect of which is to discover any seams or flaws which may have previously escaped detection. The tire is then ready for putting in the centres. After being heated to a white-heat, they are set in sand-moulds, such as are used for ordinary cast-iron wheels. The centre is then to be filled with the iron, which is poured in as soon as the top of the mould can be put on and the vents arranged. The molten iron, meeting the steel at a temperature almost equal to its own, forms a perfect weld, so that the iron centre is as firmly joined to the steel as its own particles are to each other.

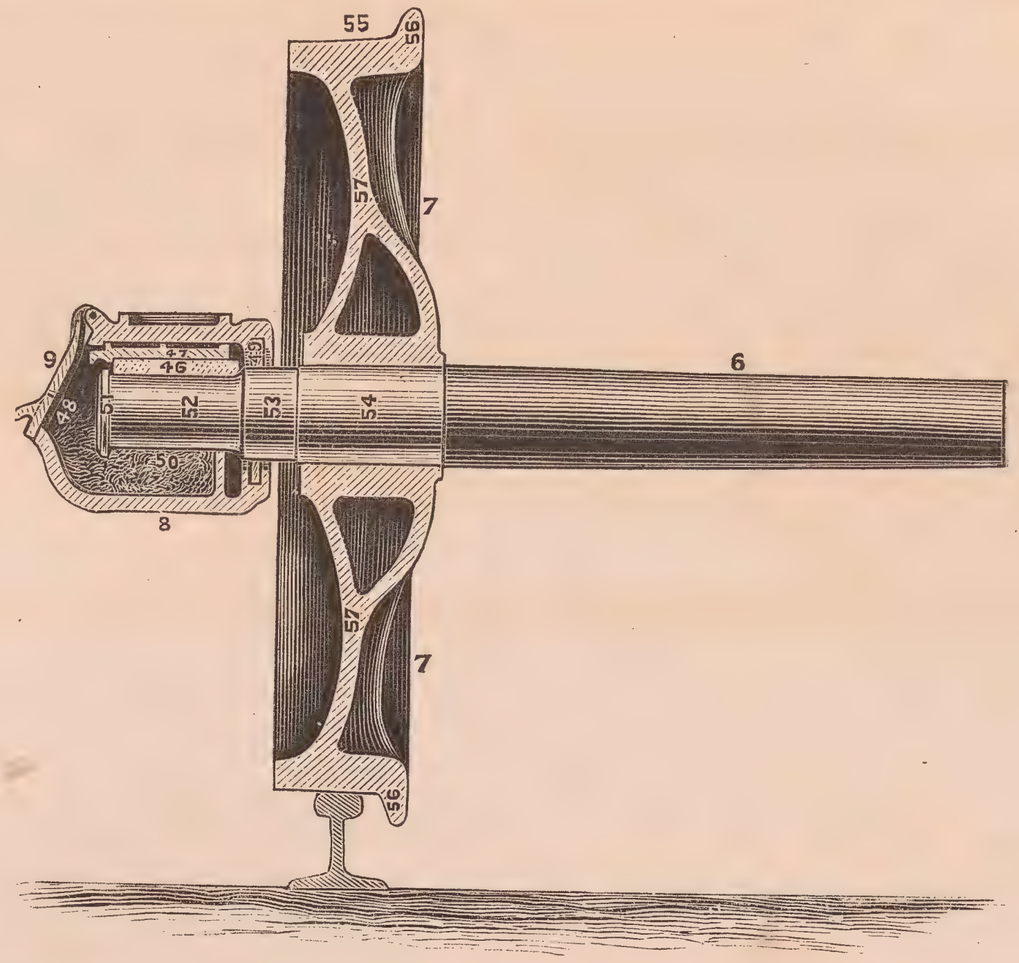
By this process several very important advantages are gained. The steel can be of a much higher grade than it would be safe to employ were any other method of fastening used, and may approach in hardness the chilled tread of a cast-iron wheel. As the steel tire is stronger than the chilled tread, and can at the same time be turned up perfectly true, nearly if not all the advantages of the cast-iron wheel are added to the well-known good points of the steel-tire wheel, while the method of construction does away with the objections hitherto urged against the latter.

After the wheel is cast it is by no means finished. It is at once taken to a pit, where it is cooled slowly, to prevent unequal contraction. It is then annealed and put in a lathe, where the tread is turned off, when it is ready for service.

The quantity of carbon in the ingot metal varies from .014 to .089, which is about the hardest metal used here. Each wheel has the amount of carbon contained in it cast in figures upon it, so that wheels of unequal hardness may not be put on the same axle.

Before this plan was adopted several wheels failed, and it was some time before the discovery was made that one was softer than the other on the same axle, and when wear once began it went on with increasing rapidity.

The establishment is now turning out about 500 wheels per month. A large number of them are in use on the Boston and Albany road, where they are constantly watched, and any improvement or alteration which practice suggests is adopted. As Mr. Washburn expresses it, he has been slowly perfecting each step of the process, feeling his way to greater perfection, and, in fact, learning the trade. We made great efforts to ascertain the actual mileage these wheels are capable of making, but failed to find one of them worn out. The nearest approach to it was a pair of wheels condemned on the Erie Railway, where they had run 100,000 miles under a sleeping-coach. The tread of the one examined had not worn so as to entirely obliterate the tool-marks of the original turning. Its mate had been broken up to discover whether flaws really existed. The wheel was, apparently, as strong as the best cast-iron wheels made. When it was broken, it had to be done under a drop. The actual facts seem to be that the wheels have not been running long enough to enable us to assign them a life-time with any accuracy. Whatever it is, it will probably be very much over 100,000 miles, as wheels now running that have made that distance do not seem to be wearing out.



SECTION OF WHEEL AND OIL-BOX.

Railroad Accidents.

THE following are a few of the most disastrous accidents which have occurred in this country within the last twenty years:

May 6, 1853.—The Norwalk Bridge accident. Forty-five persons killed and some thirty injured.

July 5, 1854.—A collision between an excursion-train of twelve cars and an accommodation-train took place on the Baltimore and Susquehanna Railroad. The excursion-train was being pushed at the time of collision by its locomotive, and some six cars were crushed. Twenty-nine persons killed and over fifty injured.

October 27, 1854.—A passenger-train from Niagara, on the Great Western Railroad of Canada, ran into a long gravel-train backing toward it. Forty-seven persons were killed and some sixty injured.

August 29, 1855.—A passenger-train on the Camden and Amboy road while backing ran into a wagon, and the four last cars of the train were thrown down an embankment. Twenty-five persons were killed and some sixty injured.

November 1, 1855.—An excursion-train of eleven cars on the Pacific Railroad of Missouri, on the occasion of the opening of the road, was crossing the bridge over Gasconade River, when the bridge gave way, precipitating the train thirty feet into the water. Twenty-two were killed and some fifty injured.

July 17, 1856.—A collision took place on the North-Pennsylvania road between an excursion-train of ten cars, containing some five hundred children with their teachers, and a regular train. Five cars were burned, sixty-six persons were killed and over one hundred injured.

March 12, 1857.—A locomotive ran off the track of the Great Western Railroad of Canada while approaching the bridge over the Des Jardines Canal. The train fell through the bridge and crushed through the ice into eighteen feet of water. Sixty persons were killed and a large number wounded. In this case, it was thought that a self-coupler would have saved the rear cars of the train, which were, however, both linked and chained to the forward cars and were dragged over by them.

June 17, 1858.—A passenger-train on the Erie road, near Port Jervis, encountered a broken rail. The last two cars were thrown from the track and precipitated down a thirty-foot embankment. Six persons were killed and fifty injured. In this case, had the coupling held, no injuries to person would have been sustained. The cars ran twenty-five rods after derailment before the coupling broke.

June 27, 1859.—A passenger-train on the Michigan Southern road was precipitated into a rivulet near South-Bend by the giving way of a culvert. Thirty-four persons were killed and some fifty injured.

April 14, 1867.—A night express-train was thrown from the track at Carr's Rock, on the Erie Railway, by a broken rail, and rolled down an embankment. Twenty-four persons were killed and eighty injured.

February 6, 1871.—A night express-train, on the New-York Central and Hudson River road, was thrown from the track on a bridge near New-Hamburg by a collision with an oil-car. The locomotive and one or two cars were precipitated through the ice and others set on fire. Twenty-one persons were killed and a large number injured.

The Breaking of Rails.

A PITTSBURG contemporary demands an examination of rails, and the removal of all that are found fractured, to prevent accidents from broken rails. Our contemporary does not seem to be aware of the fact that this system is practiced by all railroads—that if a rail is found absolutely broken, it is removed at once. It is not here where the accidents from "broken rails" occur, but in the fact that the rails fail at the moment the train is passing over them, which no foresight can avoid. Two qualities are necessary to make a good rail, which qualities are hardness upon the surface, to withstand the pounding of the wheels, and extreme toughness, or tensile strength, to carry the weight without separating the fibrin of the iron. These two qualities can not well be combined in the same lamina of an iron rail; and, therefore, the manufacturer in constructing his "pile" of iron from which the rail is formed uses a very tough iron for the bottom plate, and a very hard iron for the top plate, to combine the two qualities in the opposite surfaces of the same rail. And it is not unfrequently the case that, however hard the wearing surface may be, many fractures will take place, and the iron will "broom" and separate like pounded wood; yet the under portion of the rail will carry the weight with the greatest safety. So that if a rail were condemned on account of the fractured appearance of its surface alone, the regulation could not be relied upon as a guarantee that it would break sooner than another rail, having a perfect surface.

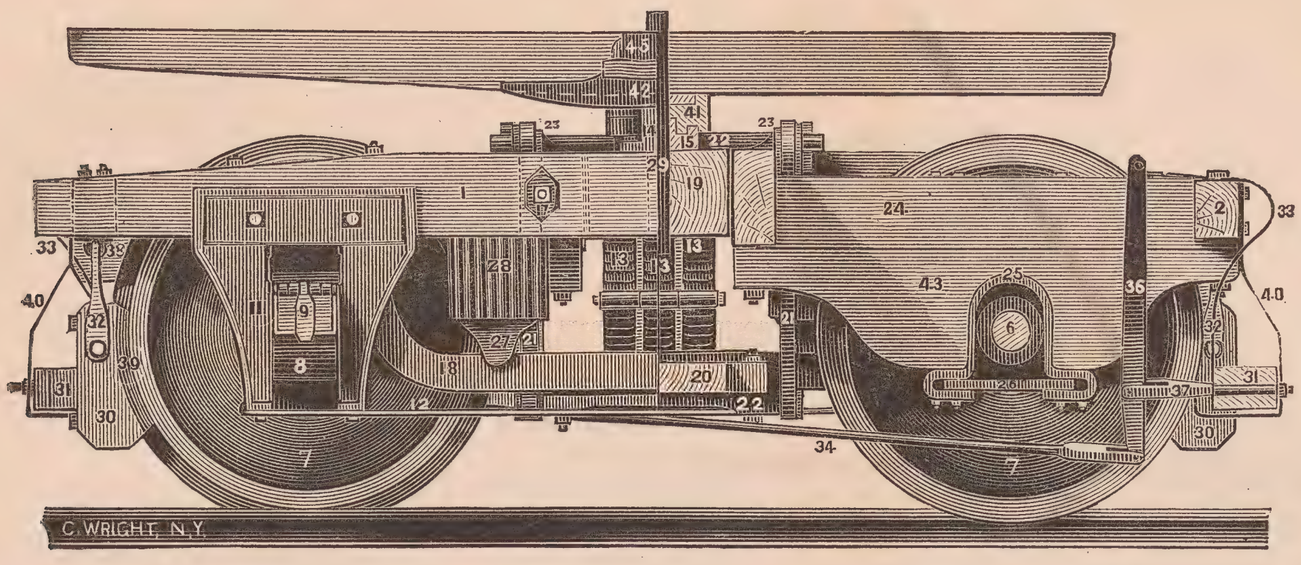
Scientists have lately agreed that the more frequent breaking of rails in cold weather than in warm is not owing to the presence of *frost in the iron*, as has so long been held, but to the more unyielding nature of the ground, occasioned by the frozen condition of the same. The blow of the wheels upon the rail, when the latter is placed upon an elastic bed, is not apt to affect the rail disastrously; but when there are inequalities of bearing upon an unyielding bed, disaster is quite sure to follow the application of a blow or unusual weight. In fact, experiment has proven that iron is stronger at a cold than at a warm temperature —*Pittsburg Manufacturer.*

Some Railroad Facts.

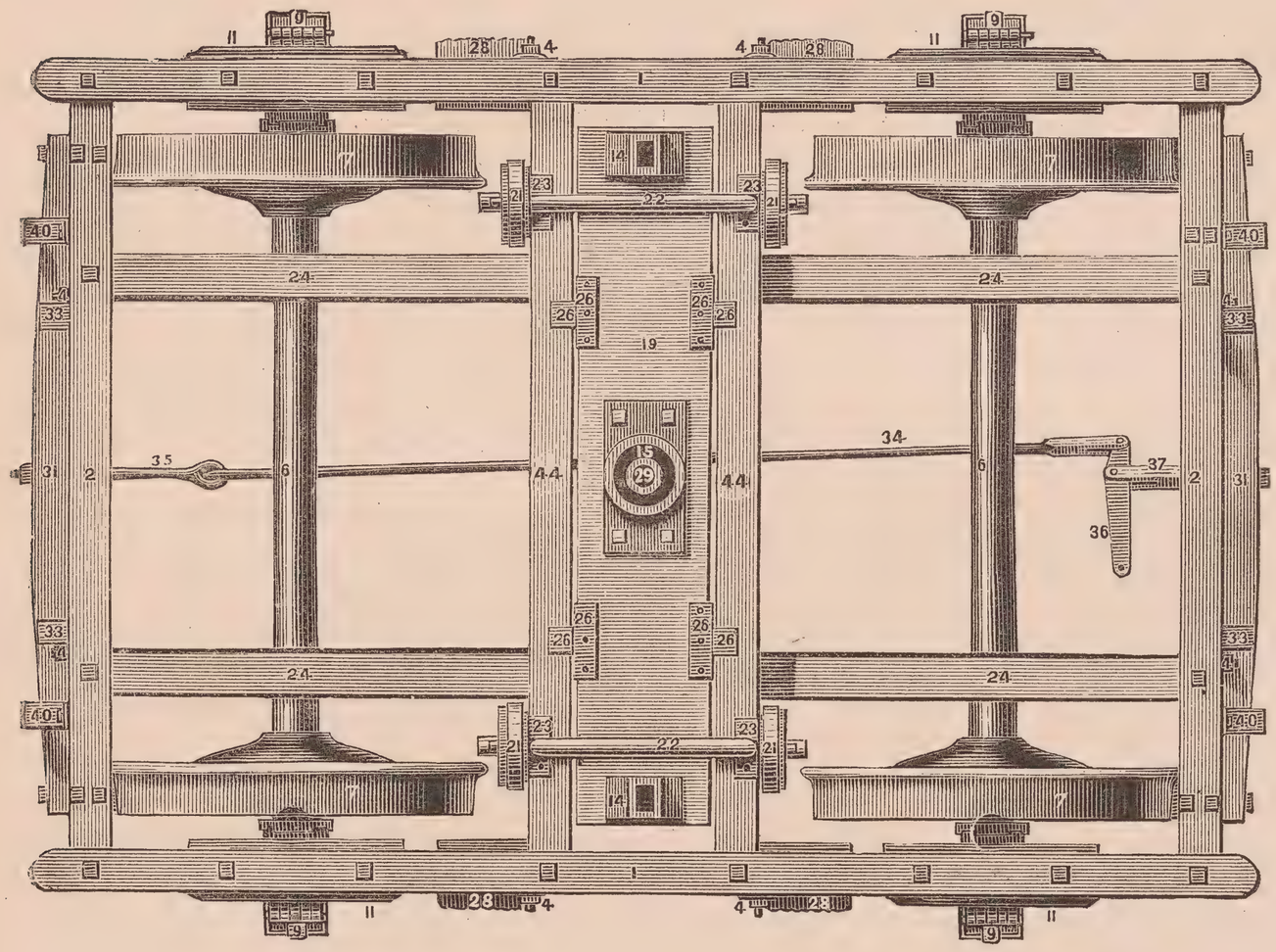
THE statement has been as frequently as loosely put forth by the American press that the accidents by collision, etc., which occur upon our railroads, could not occur on a European railroad. The railway commissioners of Massachusetts have just made a report, in which they examine this and kindred questions. They show that the causes of railway accidents in all countries are very similar. The general belief that there are more accidents to passengers on railroads in America than in other countries is found to be fallacious After clearing away the differences in presenting statistics which have hitherto rendered this subject obscure the most surprising results are obtained. Bringing the figures of the several countries into direct comparison, the returns indicate that among passengers carried by railroads there are killed and injured on British railroads, one in 430,000; Massachusetts railroads, one in 1,475,000; Belgian railroads, one in 1,600,000 Prussian railroads, one in 3,000,000; French railroads, one in 4,000,000,

By far the most frequent causes of railway accidents are those for which the victims are the most, and the railroad companies the least to blame. Five times as many fatal accidents occurred to persons "unlawfully or carelessly on the track"—chiefly to those who were walking on it as if it were a public highway—as to passengers on the trains. A willfulness of the public in getting on and off trains in motion—a habit which will not brook restriction—is the next most fruitful cause of accident. Next to this come "overhead," "bridge" accidents to brakemen. Not the least satisfactory of the conclusions attained by the commissioners is that the risk of personal injury to a railroad passenger is less than one to a quarter of a million; and that not only is there no foundation for the charge of habitual recklessness in railway management, but the actual combination of safety with speed in conveyance by rail is "perhaps the most remarkable result accomplished through an unceasing exercise of human care, skill, and foresight, which has ever come within their range of observation."—*Exchange.*

PASSENGER-CAR TRUCK.



SIDE VIEW.



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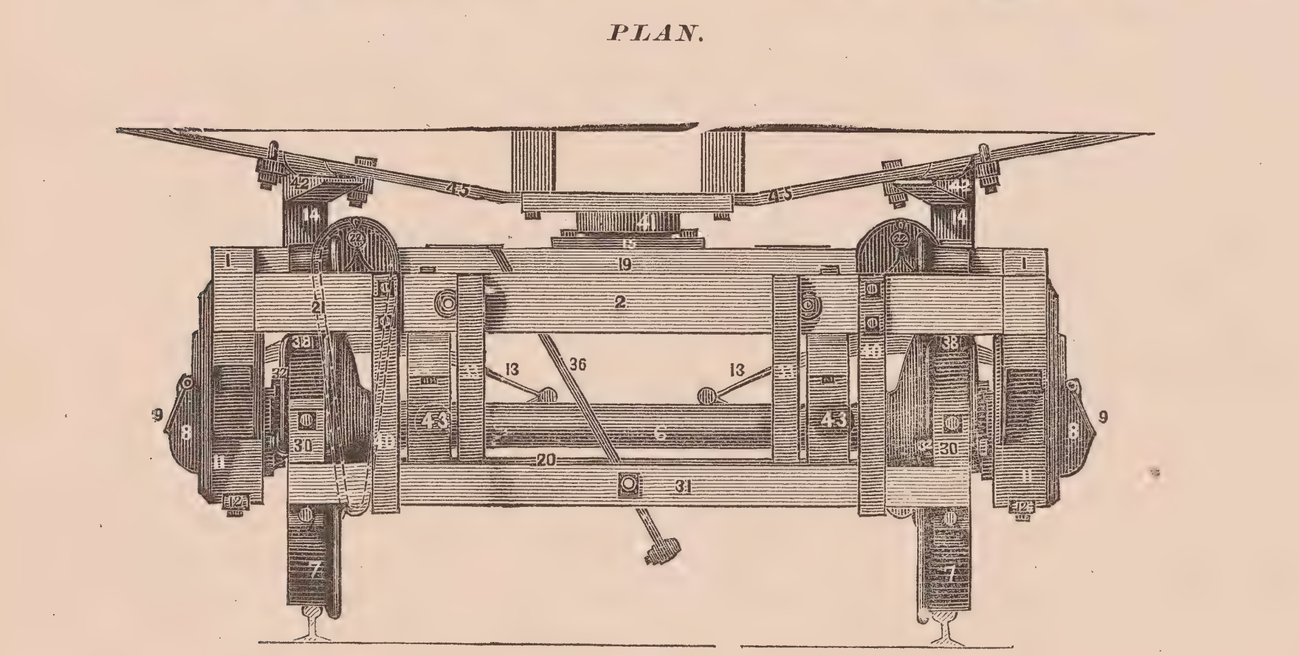

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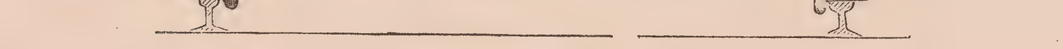


END VIEW.

Dictionary of Terms for Car-Builders.

THE following circular will explain the purpose of the engravings we herewith insert. The blank forms which accompany them in the circular are omitted :

CIRCULAR.—The Committee of the United American Master Car-Builders' Association, who were appointed to publish a dictionary of terms used in the construction and repair of cars, in order to learn the names in common use in different localities, send herewith engravings of railroad car-trucks, on which each part is numbered. A blank is also appended herewith, on which you are requested to write *distinctly*, opposite each number, the name or names used in your shop for the piece designated by the same number in the engraving. Master car-builders are requested to fill out the blanks and return as early as possible, to

LEANDER GAREY, Secretary,
Morrisania, New-York.

Boston and Albany R. R.....F. D. ADAMS,
New-York and New-Haven R.R...M. C. ANDREWS,
New-York and Harlem R. R.....LEANDER GAREY,
Philadelphia and Reading R. R...A. STEINBACH,
Erie R. R.....C. A. SMITH,
New-York Central R. R.....JOSEPH JONES,
Pennsylvania R. R.....I. W. VAN HOUTEN,
Committee.

The Secretary has also handed us the following additional circular, to which we beg to call the attention of our readers :

The Committee appointed by the Master Car-Builders' Association to prepare and publish a dictionary of terms, in order to render the work as complete as possible, solicit the aid and coöperation of all master car-builders. The committee expect soon to have ready for distribution engravings of iron trucks, and some of the more important parts of the car-body. A prompt reply from all railroads to the circulars already issued as well as to those to be sent hereafter, will be a great assistance to the committee, and materially hasten the completion of the work. The circulars already issued have been mailed to all master car-builders whose address could be obtained. If there are any who have not received them, they will be supplied by forwarding their address to the office of the Secretary.

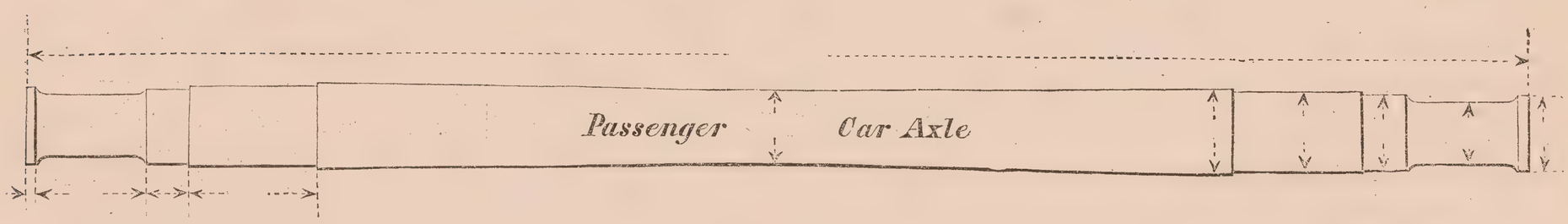
LEANDER GAREY, Secretary,
Morrisania, New-York.

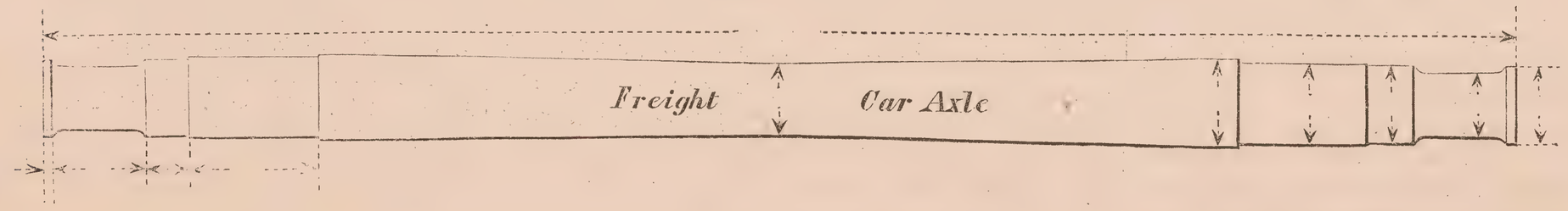
Car-Axles.

THE want of uniformity in those parts of cars which are most subject to wear and breakage, is so serious an evil that the Master Car-Builders' Association have determined to try to establish some standard form and size for axles and oil-boxes. As a preliminary step, they desire to learn the dimensions of the axles which are now used on different roads for new cars. By marking on the engraving below the dimensions of your standard axles, as indicated by the dotted lines, and returning it to the secretary, you will aid the committee in accomplishing what they have in view.

It is also desirable to know, at least approximately, how many of your standard axles are now in use on your road. Please give the number as near as you can in the appropriate blank below.

Yours very respectfully,
LEANDER GAREY, Secretary,
Morrisania, New-York.





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BY

VOSE, DINSMORE & CO.,

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Editorial Announcements.

Correspondence.—*We cordially invite the coöperation of the railroad public in affording us the material for a good mechanical paper. Articles relating to rolling stock and machinery, by those practically acquainted with those subjects, will be gratefully received. All communications must be addressed to Vose, Dinsmore & Co., No.* 1 *Barclay Street.*

The name and address of the writer must accompany all communications designed for publication.

Advertising Rates.—*For one square, or one fifth of a column,* $5 *per month, or* $50 *a year. For half a square,* $3 *per month, or* $25 *a year. Larger advertisements by special contract.*

All communications in regard to advertising should be addressed to L. F. Dinsmore, *Post-Office Box* 4055, *New-York City, who is our agent for advertising, and authorized to make contracts, collections, etc.*

Engravings and Illustrations.

We would invite the attention of Master Car-Builders and others to the advantages to be derived from publishing in The National Car-Builder *engravings designed to illustrate the various features and details of car construction, and especially such improvements as can not otherwise be clearly presented. We will procure cuts to be made in the best manner from drawings or models that may be sent us, and charge only for the cost of engraving, inserting the same in our paper with suitable descriptive details, without charge. The cuts thus made by us, or that may be sent us for use in* The National Car-Builder, *will of course be returned promptly to the owner.*

The Master Car-Builders' Convention.

The present number of our paper will doubtless be in the hands of its readers several days before the meeting of the annual convention at St. Louis; and we avail ourselves of the opportunity to urge upon every member of the association the importance of a full attendance. We trust that no master car-builder will be remiss in the performance of his duty in this respect. It is a service which is due from each and every member to the body collectively, and also to the public, and can not be neglected without impairing the usefulness of the association to which he belongs. Every organization of this kind is based upon that principle of coöperation and united effort which experience has shown to be most effective in the attainment of certain proposed ends, and is always presumed to have some well defined purpose in view, and to aim at the accomplishment of enduring and practical results. Mere organization alone, however, is of little avail. It is of itself but the means to an end—a device for consolidating individual effort; and stated meetings held in accordance with official programme are little else than a profitless waste of words unless the necessary preparatory labor has been performed in the matter of procuring and arranging information and facts upon the various topics to be discussed and acted upon. Some part of this indispensable preliminary work devolves upon each member of the association, and every thing depends upon the way in which it is done. If it is performed from a mere sense of duty only, without any real earnestness or enthusiasm; if it is regarded as a task; if heart and soul are not in it; if it involves no willing sacrifice of time and personal convenience, depend upon it the right spirit is wanting, and the deliberations of the members collectively, as an organized body, will be crude, unsatisfactory, and barren of good results. The primary objects of the association, and the important interests it is designed to promote, should always be kept in view. The records of each annual meeting should exhibit some clear indications of progress in harmonizing opinions, correcting errors, establishing principles, and promoting uniformity of practice in the many details of car construction, so important to the railway interests of the country.

We make these remarks in no captious spirit, and with no design to reflect upon the doings of previous annual meetings. We trust no master car-builder is disposed to undervalue the advantages of the association; but if there be any such, what we have written will do no harm. Enough has already been done to establish the organization upon a permanent basis. Its field of usefulness is a wide one, and constantly increasing. Its growth should be commensurate with the railway system of the country. There is every thing to stimulate exertion on the part of each individual member to contribute something valuable from his own observation and experience for the common benefit. The membership is now sufficiently large to render these individual contributions of much importance in the aggregate. It is scarcely possible for any two men engaged in the same mechanical pursuit, and especially one embracing so much variety of detail as car-building, not to have discovered within a period of twelve months a remedy for some defect, or some improvement in ordinary methods, the suggestion of which would not be of service to the other, and thus both be benefited by an interchange of ideas.

Herein is the advantage of association; and if the principle, in its application to the construction of railway cars of every class, could be carried into practical operation, the result would be a very material reduction of expenditure, and a corresponding increase of earnings, upon all roads.

Among the many important topics which will claim the attention of the convention is the want of greater uniformity in the forms and dimensions of axles, oil-boxes, journal-bearings, and other parts of a car which require most frequent renewal. The adoption of a recognized standard is extremely desirable, especially for car-axles, of which it may be said that each road now has its own, of such form as chance, accident, or prejudice may have suggested, and which of course causes confusion, expense, and delay in the interchange of cars by different lines, for the purpose of facilitating the transportation of freight. Railway managers know that freight has been shipped across the continent in a certain number of hours; but they do not appear to understand why some cars of the same train, and starting at the same time, reach their destination days before the others. The evil grows in proportion as the rolling-stock of the country increases, and is becoming more and more serious. To determine the dimensions of a standard axle, will require careful investigation and the exercise of the soundest mechanical judgment.

A dictionary of terms used in railway construction and operation is also very much needed. The engravings and accompanying circulars on another page will indicate the progress that is being made in its compilation. There are also other matters of importance, which our space will not permit us to dwell upon, but which will doubtless receive due attention at the hands of the convention.

We desire, however, to make a special request that the several committees, to which were assigned subjects for consideration at the last annual meeting, will be prepared to submit their reports to the convention, embodying all the facts and information they have been able to obtain, and arranged in such form as to be readily understood and intelligently acted upon. The dispatch of business by a deliberative body is greatly facilitated by having the work of committees well done, in the matter of preparing their reports.

The day fixed for the meeting of the convention is Wednesday, June 12th.

Our Directory.

We desire to make our directory of master mechanics and master car-builders as complete and reliable as possible; and for that purpose we again request our readers to give us prompt advice of any errors or omissions they may notice, either in the names of roads or persons.

Station Indicators.

Editor of The National Car-Builder:

Dear Sir: I wish to ask, through your valuable paper, why it is that railroad corporations do not introduce more generally in their passenger-coaches some kind of station indicator? Some effective device of this kind would be a very great convenience to the traveling public, and it seems strange that it should have been so long neglected. Some plan by which the name of every station can be exhibited to the eyes of passengers in clear and distinct lettering is infinitely preferable to the hurried and indistinct announcement of it by the brakeman.

I have seen station indicators of this kind upon only two New-England roads, the Springfield and New-Haven and the Hartford, Providence, and Fishkill. I understand they are to be put in all the passenger-coaches on these roads, and I sincerely hope all other roads will follow their example; for I well know, from the expressions of approval I have heard from hundreds of passengers on trains where they were used, that they ought to be speedily and generally adopted. I watched the working of one of these indicators upon the last-named road for more than a hundred miles. The names of the stations were very plainly shown, and always in time to give passengers a chance to get ready for leaving the car—which, by the way, works a saving of considerable time at the stations.

The one I have referred to was patented in 1862, and is said to be very simple in its arrangement and not liable to get out of order. I trust you will call the attention of railroad men to this subject, and in doing so you will deserve the thanks of many travelers.

X.

Mr. H. G. Brooks, of the Brooks Locomotive Works, Dunkirk, N. Y., was chosen a director of the Dunkirk, Warren, and Pittsburg Railroad, at the regular meeting of stockholders, held at Fredonia, on the 7th ult. The selection of Mr. Brooks as a member of the directory is a fitting compliment to his acknowledged business capacity, experience, and enterprise.

The extensive works of the Harrisburg Car Manufacturing Company, which were destroyed by fire on the 25th of April, are being rapidly rebuilt. The new buildings are of brick, and many improvements will be introduced in their construction designed to afford increased facilities for turning out work. Their capacity when completed will be equal to 14 cars per day. It is expected that the new works will be sufficiently advanced in thirty days to be able to turn out 4 cars per day, and double that number in sixty days. The company are now making three or four cars per day in the new buildings erected since the fire, some distance from the site of the old works.

A movement is on foot in Boston, headed by the Hon. Josiah Quincey, requiring the railroads centering in that city to attach daily second-class cars, at one third of the usual rates, to at least two trains entering the city in the morning and two leaving at night. In London the railways are required to run trains morning and evening ten miles for a fare not exceeding two cents a trip. The question of cheap fares and depot transit is one which demands the consideration of all great centres of population, trade, and manufactures.

Straw-Board for Car-Wheels.

BY W. E. PARTRIDGE.

In a previous article on the subject of paper car-wheels we promised to say something in regard to the material used in their manufacture. This material is straw-board, of the same quality as that used for the making of paper boxes. The supply is enormous, and seems to be capable of indefinite extension. The first lot was offered for sale in New-York City in 1844, and consisted of only one or two tons. This small lot was regarded by the box manufacturers with a good deal of indifference, and was bought by Mr. Butterfield, of the present firm of Mallory & Butterfield, who from the first took a great interest in the product. In 1855, so rapidly had the trade grown, the paper-box makers no longer made use of what are called band-box boards. The product in 1860 was only 8060 tons, while during the past year it is estimated at no less than 18,000 tons. There are now about sixty straw-board mills in the country, and in case of a demand, the product could easily be increased to 30,000 tons. Aside from the uses now made of the material, including its recent application to car-wheels, there are obviously many other purposes for which it may be made available in the range of the mechanic arts.

The question occurs as to whether we have not here a substitute for wood in many kinds of light and ornamental work where strength and durability are requisite? Some well-ascertained facts seem to justify an answer in the affirmative. This paper-board, when made into a panel, is stronger and lighter than wood; it has a perfect surface, will not shrink, and is not liable to warp. Doors made of it will bear a great deal of hard usage without showing it. It can be fashioned into any required form and fastened in its place like an ordinary wood moulding, and will take paints, oils, and varnish in the same way. These are points which any car-builder will readily appreciate. The writer has seen entire doors, saving the outside framing, made from a set of panels which were made in a single piece. These panels were an inch in thickness, and, by a peculiar arrangement of the paper inside, were partially hollow, which diminished the weight without impairing their strength. It is quite probable that a car-body might be lightened twenty-five per cent by the use of this material instead of wood for panels, doors, and ornamental work. If proper precautions were taken, even the posts and all the framing above the truss-plank, except the ribs for the roof, could be made of this material.

The consumption of our native woods for building purposes of every description is so enormous that timber will become more and more valuable, and the supply less and less in proportion to the demand, until straw-board and straw-paper will be cheaper than wood for many purposes before another half-century has elapsed. Before this time comes, however, we shall be able to produce an article which will, to a great extent, take the place of wood, and render us independent of our forests.

A Plan for Keeping Oil.

Among the many noteworthy and convenient arrangements to be found in railway shops is one contained in those of the New-York and New-Haven Railroad, at New-Haven, and designed for the keeping of oil in such a way as to almost entirely prevent waste, and at the same time reduce the trouble of handling to a minimum. It may be called an oil-house, the dimensions of which are about 15 by 20 feet. The walls are of brick, and the roof of corrugated iron. The interior consists of two rooms, one of which is devoted to waste, cans, and other things belonging to the oil department; the other room is devoted to the oil. The tanks for holding it are of thin boiler-plate. They are square, and set so that the tops are about eighteen inches or two feet below the floor level. The necks rise to within a few inches of the floor level. These necks are in line with each other and the door. The floor is of cast-iron, with small corrugations in it. Over each tank a small section of the floor, about twenty inches square, is movable. When it is desired to fill a tank, the floor-plate is lifted by putting a screw-handle into a hole for the purpose, then the cover of the tank is removed, the barrel tapped or the bung knocked out, as the case may be, and the oil allowed to run into the tank. Of course there is no waste and very little trouble in filling a tank. Along one wall of the room are a row of sinks, each one containing a pump which connects with a tank, the waste-pipe of the sink running any oil that might drip from the pump-nozzle, or be spilled, back into the tank. The various measures for each kind of oil are kept in the respective sinks. The doors and window-shutters are of iron, so that the building is practically fire-proof. One man has the entire charge of the oil and the oil-house, and attends to nothing else.

The loss in the ordinary modes of handling oil is very large, and on many roads amounts to so large an item in the course of a year that the cost of an oil-house, together with the expense of maintaining it, would be small in comparison. By proper forethought, almost any company may build such a house at a cost but little greater than that of the raw material employed.

Steeled Wheels.

This novel title is given to railway wheels made by a process which must rank among the great improvements recently made in the working of metals, by W. G. Hamilton, engineer of the Ramapo Wheel and Foundry Company, which, after four years of experimental trials, is now brought prominently before the public.

Mr. Hamilton, who is well known to the railway profession through his *Manual of Useful Information to Railway Men*, has worked out the problem of making chilled car-wheels out of non-chilling irons, and at the same time increasing the strength of the mixture above that of the most expensive charcoal irons.

The process consists in part in melting scrap-steel with the ordinary charge of pig-metal in the cupola, by which an increase of strength of from 20 to 50 per cent is given to the metal.

A. Whitney & Sons, the extensive wheel-founders of Philadelphia, have been testing the practical utility and value of the process; they have made some 15,000 wheels during a continuous working in the last three months, and report it a most complete success.

That this process will enable them, by adding to their usual chilling charcoal irons a portion of non-chilling soft charcoal irons or anthracite metal, to produce a car-wheel of greater strength, and at a much less cost than with high-priced chilling charcoal irons alone.

To the railway community the value of this improvement will be understood when it is known that the supply of charcoal irons is yearly diminishing and the cost increasing, and that the steeled metal gives greater security to their rolling stock.—*Exchange.*

Improvement of the Steam-Engine.

In a paper read before the Polytechnic Association of the American Institute by Professor Thurston, on the above subject, he summed up his conclusions in the following statements:

The direction which improvement seems now to be taking, and the proper direction, as indicated by an examination of the principles of science, as well as by our review of the steps already taken, seem to be:

Steam must enter the machine at the highest possible temperature, must be protected from waste, and must retain, at the moment before exhaust, the least possible amount of heat. He whose inventive genius or mechanical skill contributes to effect either the use of higher steam with safety and without waste, or the reduction of the temperature of discharge, confers a boon upon mankind.

In detail: *In the engine*, the tendency is, and may probably be expected to continue, in the near future at least, toward higher steam pressure, greater expansion in more than one cylinder, steam jacketing, superheating, a careful use of non-conducting protectors against waste, and the adoption of higher piston speeds.

In the boiler, more complete combustion without excess of air passing through the furnace, and more thorough absorption of heat from the furnace gases. The latter, I am inclined to suppose, will be ultimately effected by the use of a mechanically produced draught, in place of the far more wasteful method of obtaining it by the expenditure of heat in the chimney.

In construction, we may anticipate the use of better materials and more careful workmanship, especially in the boiler, and much improvement in forms and proportions of details.

In management, there is a wide field for improvement, which improvement we may feel assured will rapidly take place, as it has now become well understood that great care, skill, and intelligence are important essentials to the economical management of the steam-engine, and that they repay liberally all of the expense in time and money that are requisite to secure them.

Recent Patents.

Brake for Railway Cars.—Anton Tatzel, Sen., and Friedrich Kinn, of New-York City.—Frames pivoted to or hung upon the axles are connected rigidly with the brake-shoes and guards by arms. The frame can not ordinarily swing on the axle to drop the brake on the track, as rods, above the axle, connect it with levers at both ends of the car, which levers are locked in suitable manner. In case of an emergency, when the car approaches a place of danger or a person falls in front of the wheels, the front lever is quickly dropped by the attendant, which allows the brake in front of the wheel, by its own weight and the friction of the wheel, to drop upon the track right in front of the wheel. The wheel in its further motion runs upon the concave part of the brake, and is thereby lifted from the track, spending its power against the brake, while, it is claimed, the motion of the car is speedily but gently arrested by the excessive friction of the brake-shoe on the track. The shoe is flanged, to prevent it from running off the track. The rods connecting the shoes with the levers are jointed, to permit lateral bending, which is necessary when the car runs on a curve.

Railway-Car Wheel.—F. M. Ray, Jr., New-York City, executor, etc., of F. M. Ray, Sen., Boston, Mass.—This new car-wheel is made in two parts, completely isolated from each other by a double-flanged contiguous ring of rubber, compressed to a density at which it is always retained, part of said contiguous flanged ring being forced by a projection on the tire into a recess in the hub, and the whole constituting an improved article of manufacture, in which all the strains to which the spring is subjected, namely, direct radical strains, lateral strains, and torsion, are resisted by a part of the aforesaid rubber ring.

Car-Coupling.—C. Whitus, Philadelphia, Pa.—The more important characteristic of this car-coupling is found in the arrangement of a counterpoise with open bearings at the bottom of the draw-head over an aperture formed for it in said bottom, so that it can be employed to hold the coupling-link at the required elevation or angle, when adjusted for coupling cars of different heights, or cars standing on curves, and so as to leave the draw-head space clear when the act of coupling is completed.

Door-Catch for Railroad-Cars.—Charles Graham, Kingston, Pa.—This invention consists in the combination of a hook-ended, lever-like catch, pivoted within a shell which is to be secured to the floor of the car, and is actuated by a spring, with a roller supported in a suitable bearing-piece, which is to be secured to the lower part of the door, whereby a very cheap and effective catch is produced which is automatic in its operation.

Bully Bly.

It was a railroad engineer,
One Bully Bly by name,
And he was stout and six feet three
And strong as any you shall see,
Was Bully Bly.

A four-foot Norris he did run
All on the old flat bar,
And on an up-grade, off her time,
You'd laugh to see her shake and climb,
And hear her toot.

The farmers on the old cross-road
Could always bet on him;
And many a fast or slow Lepine
Was daily set by that machine
As she went by.

To see him stooping in his cab,
His throttle-plug in hand,
It was a pleasant sight to view;
For he was tall and handsome, too,
Was Bully Bly.

Down in the cut at Briar's Hill—
The berries they was ripe—
And all the children, bad and good,
And birds from all the neighborhood,
Was there that day.

And Bully's engine, here she come,
A flying through the air;
And Bully saw the danger nigh;
"And so," says Bully, "I must try
And hook her back."

He whistled brakes with right good will,
The gals and boys they screamed;
She wouldn't hook her backin' gear!
The track was full, and death so near!
What could he do?

He shut her off—spit on his hands;
He made one awful plunge,
With all his strength he grabbed her wheel,
While in the ground he sunk his heel,
And held her fast.

But though these little ones was saved,
The engine, she was done;
Her rods was bent, her tire came off,
She leaked like some old water-trough,
Her steam run down.

And all this tale I tell you's true,
I knew the engineer;
Her bones was in the scrap-heap lain,
She never made the run again,
My name? B. Bly.

Louisville Ledger.

A New Lubricator.

The *Railroad Journal* calls attention to a comparatively new lubricator which is now in the market. The manufacturers, Messrs. Isaac U. Coles & Co., have had it thoroughly tested on several prominent railroads, and the result proved their compounds the cheapest and most satisfactory lubricators ever produced. Their tallow packing for car-journals, besides being about twenty-five per cent cheaper than any other lubricator, completely prevents hot journals, protects the inside of the boxes against dust, and consequently preserves the brasses. The last, though not the least, feature is that it needs less attention than oil and waste.

In regard to the tallow lubricator, we will only observe that it can be run on any engine, in place of tallow, with the same profit as the above named, as it will not waste or melt away any quicker than it can be consumed. The oil will not gum, and it will do the same work as sperm-oil.

Wrought-Iron Railway-Ties.

A plan of using wrought-iron ties, practiced on some of the Belgian railways, has given evidence, after several years' trial, of great durability, and is regarded as worthy the attention of parties, (from their want of elasticity to wooden ones,) since it forms a compromise between the two, in which wood acts as the mere cushion and iron the solid foundation.

The rails in this case are four and seven eighths inches deep, with two and three quarter inches base, the gauge four feet eight and one half inches; the joints are formed on the "fished principle," and secured with four and three quarter inches bolts. The sleepers are simply rolled I beams, eight feet five inches long, (seven inches deep, five sixteenths of an inch web, and two and one half inches heads,) placed eight feet between centres. Instead of resting directly on these, a painted oak block is interposed between them and the rail. Such blocks are ten inches long, six and one fourth inches wide, two and one half inches thick, and have a channel four and one eighth inches wide by one fourth of an inch deep, in which the base of the rail rests. Two three-quarter inch bolts, with one and five eighths inch round washers, secure the rail to the I beam; the latter lies with its web in a horizontal position. The bolt-holes are bored close to the flanges of the rails, to allow of the washers champing the latter; and the points of the bolts are slightly burred to prevent the loosing of the nut.

Miscellaneous Items.

A new safety signal, invented by Mr. George B. Cummings, is to be tried on the Boston and Maine Railroad. A dial, with figures from one to ten, nine inches in length, is set in motion by a rod being struck by a passing engine, and continues in motion ten minutes, and showing a red signal to an approaching train. The illuminated dial can be seen a great distance, and when wound up, will run for ninety trains. It is designed for curves, tunnels, and other dangerous places.

The McNairy & Claflen Manufacturing Company produce all of the different kinds of iron-work required in the construction of cars and bridges. They employ 90 men and 40 fires in the blacksmith-shop. For axle purposes they use two lathes and a 150-ton hydraulic press. In the machine-shop 70 men are employed, and 125 men in the freight-car department—for passenger and street-car work, about 40 men. They manufacture street-cars for almost every city in the Union. They are running night and day, and their orders are constantly increasing.

The New Long Bridge over the Potomac at Washington is now completed with the exception of the wooden partition between the railroad track and the carriage way. The draws are built of wood, resting upon an iron revolving drum, which is based upon magnificent arches of the finest circular stone foundation. The end of the first draw has one end double the length of the other, which is balanced with seventy tons of iron, and is readily turned by four men. The second draw on the Washington side is of iron, and is easily and rapidly revolved by one person.

At the present time there are 80 Pullman palace-cars arriving at and departing from Chicago every day. The amount of money expended in their manufacture ranges from about $10,000 to $30,000 for each car, the average cost being about $16,500. The amount of capital, therefore, invested in the Pullman cars, which accommodate the business of Chicago, amounts to about $1,300,000. It is reported that the company has purchased a large piece of ground somewhere in the suburbs of the city, on which they will shortly erect large shops for the manufacture of their cars.

Jeffersonville, Ind., contributes $20,000 toward the rebuilding of the Falls City Car-Works, lately consumed by fire at that place. The works will be rebuilt on the latest and most modern style of fire-proof buildings, with double their former capacity, and when completed, will be the most extensive and complete of any of the kind extant, and will cost nearly half a million of dollars. The insurance was also adjusted with satisfaction to both parties.

A Cleveland inventor has just brought out an automaton side door car, to afford a means of escape to passengers in case of accidents which throw the car from the track and overturn it. The arrangement is such that when the car veers over and becomes supported only by the wheels of one side, the opposite side of the car opens promptly, thus allowing escape from the disaster.

The car-works of McVey, Walker & Co., Braddock's Field, are being materially enlarged, with a view of doubling their capacity for the manufacture of coal and freight-cars. Their orders have lately been greater than their facilities for supply, but they hope to soon be able to meet all demands.

The Lake Shore Railroad Company are making great improvements in their roadway by straightening and leveling, and laying double tracks, and adding many new turnouts. West of Cleveland, they have recently completed a number of substantial stone bridges and culverts, besides ballasting the road in superior style.

A large and magnificent reading-room has been opened in the Union Depot, Cleveland, O., for the benefit of employees on all roads entering the building. It will be used as a chapel on Sunday.

Wabash Equipment Company is the name of a new corporation, with $1,000,000 capital, recently organized at Toledo, Ohio. Contracts have already been made for the manufacture of about 1400 first-class freight-cars, besides a number of locomotive engines and other railroad equipments.

Just outside of London, Canada, the Pullman Palace Car Company have purchased seventy-five acres of land, on which to erect works for the manufacture of their celebrated coaches.

The depot of the Michigan Southern Railroad in Chicago is to be immediately rebuilt. The former plans are but slightly altered. The sides will be two stories in height, and the centre tower will contain a clock with four faces, to be illuminated at night.

Publishers' Notices.

"The Hub."—The April and May numbers of this superbly printed trade-journal are marvels of elegant typography. In this respect it has no rival, if we except the *Aldine*, which has made the development of this most beautiful of the mechanic arts its special aim. In size and general appearance they resemble each other. The tasteful and superior style in which the *Hub* is printed does not, however, constitute its only attractive feature. It is a model journal of its class in its editorial management and supervision, adhering strictly to its specialty, and evincing a thorough knowledge of what is required to render it an indispensable organ of the important branch of mechanical industry to which it is devoted. Its pages contain a large quantity of original matter, including editorials and contributions, besides judicious selections and a full summary of current trade-news, together with a great variety of appropriate illustrations of special interest to coach and carriage-makers.

The *Hub* is now printed by Mr. S. W. Green, who is also the printer of the Car-Builder and forty or fifty other periodicals, all of which are, in the matter of clear and beautiful typography, highly creditable to American progress in this branch of mechanical art.

"THE INDUSTRIAL AGE."—We are in receipt of the sixth number of this most valuable weekly journal, recently started in St. Louis. It contains sixteen pages of neatly printed matter, the general quality of which unmistakably indicates ability of a superior order in its editorial supervision. It occupies a broad field, being devoted exclusively to the industrial interests of the country, which includes the development of our varied resources and the encouragement of all great and legitimate enterprises. It is emphatically a *readable* paper, and should receive more than a mere local recognition. No manufacturer, capitalist, mechanic, miner, farmer, or railroad man should be without it.

THE CUMMING NUT-LOCK.—The tendency of nuts upon screw-bolts to shake loose under vibration is well known to every one having charge of machinery, and especially to those engaged in operating railroads. The annoyance, expense, and danger resulting therefrom are also well known. Many devices have been tried to obviate the difficulty, but without any great measure of success. The above-named nut-lock, however, seems to answer every requirement, being simple, cheap, effective, and of universal application. It can be adjusted or removed by a wrench, and locks the nut to the bolt at any desired point. It is really an improved bolt, the improvement consisting of a groove cut in the threaded part of the bolt, which is filled with a key of copper or other soft metal. The nut is screwed on *over* this key, thereby cutting a thread in the key, and taking up all the slack between the bolt and the nut. As soon as the nut is in position, that portion of the soft metal key over which it has passed is riveted up against the face of the nut with a narrow set punch. The nut, therefore, can not move in either direction without cutting its way through the soft metal, which requires the power of a wrench, steadily applied. By keeping the bolts from working, it greatly increases their durability, and the nut can be removed and replaced any number of times without injury.

For further information, address Lock-Nut and Bolt Company, 61 Broadway; also see advertisement on page 15.

VALENTINE'S VARNISHES.—We have received from the manufacturers a neatly printed pamphlet, containing one hundred testimonials of coach and carriage-builders in various parts of the country, commending these varnishes in the most unqualified terms. It seems quite evident from this testimony, that the prejudice which has hitherto existed against American varnishes is being rapidly overcome by practical tests, and that the imported article is being superseded to a great extent by that of home manufacture. The reputation of the various grades made by Messrs. Valentine & Co. has increased from year to year, as the knowledge of their superior qualities has become more widely known, from being subjected to severe and satisfactory tests. They are fully equal, if not superior, to the English varnishes in all essential requisites. They have as good body, retain their lustre and brilliancy in extremes of temperature, give a reliable and durable finish, and maintain as high a standard in every respect. This seems to be conceded by all who have given them a fair trial. Orders should be addressed to 88 Chambers street, New-York.

PASSENGER-CAR LAMPS.—We invite attention to the advertisement of Messrs. Williams, Page & Co., manufacturers of centre, side, and saloon car-lamps for burning mineral sperm-oil, or for kerosene. These lamps are now in use on railroads in all parts of the country, with the most satisfactory results, affording a cheap, safe, and brilliant light, with no possibility of falling or dripping. They have been extensively adopted by some of the leading roads in New-England, whose testimonials as to their utility are of the strongest kind. This firm also manufacture a superior style of car candle-lamps.

Facetiæ.

A WESTERN paper thus describes the burning of a grocery: "The loud alarm-bells were rung, the steam and hand-engines rushed to the scene of the conflagration; but it was too late. The flames enveloped the entire structure, the Doric columns were 'tottering to their fall,' the iron balconies were melting, the noble buttresses were a heap of ruins, and the French plate-glass in the magnificent lancet-windows was cracked and twisted by the fervent heat. The blaze roared through the imperial halls, and the mauresque ceilings, the jeweled chandeliers, the purple velvet tapestry inwrought with pearl, succumbed to the furious element, and at last the Mansard roof fell in, the heavy walls fell out, and nothing was left of the majestic pile but its ruins, reminding the beholder of the ancient palaces that line the banks of the Tigris, the Euphrates, or the Nile."

"WHAT have you that's good?" said a hungry traveler, as he seated himself at a dinner-table in Salt Lake City. "Oh! we've got roast beef, broiled ham, and broiled curlew?" "What is curlew?" said the stranger. "Curlew! why curlew is a bird, something like a snipe" "Could it fly?" "Yes." "Then I don't want any curlew; anything that had wings and could fly, and didn't leave this d—n country, I don't want for dinner."

THE mails having, for a week, failed to come to time in an Arkansas town, the local paper says it has been forced to draw heavily on the almanacs for copy, and if communication with the outer world should be still longer cut off, "we will be obliged next week to make extracts from the Bible, thus supplying some of our readers, at least, with matter entirely new to them."

AN exchange says, "Cleveland has invented a patent bug-buster, worked with an air-pump. All the apertures in a room are stopped but one, at which the deadly bug-buster is placed. By exhausting the receiver, a current of air is produced strong enough to draw all the vermin out of the room, through the air-pump, into the hopper, where they are put under the influence of chloroform, and stabbed in the back with a pitchfork."

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It requires only HALF the thickness of an ordinary Hair Mattress.

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It will immediately cool a *hot journal* while the cars are in motion, and no journal will heat where the box is packed with it.

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W. B. POST. C. W. KALKMAN.

Castoria—a substitute for Castor Oil—a vegetable preparation containing neither Minerals, Morphine, nor Alcohol. It is pleasant to take, does not nauseate, and operates when all other remedies have failed. Dr. Pitcher has experimented fifteen years in producing a preparation more efficient than Castor Oil, without its horrid taste. The Castoria regulates the system; cures constipation, stomach ache, croup, and flatulency, and kills worms. It does not purge or gripe. By its quieting, soothing effect, it produces natural sleep, and is particularly adapted to crying and teething children. No article has ever met the same endorsement from physicians, or found such immediate sale. Insist that your druggist order it for you. It costs but 50 cents.

Brilliant Railroad Car Lamp, WITHOUT KEROSENE.

New Law of Massachusetts

ABOUT LIGHTING PASSENGER CARS.

A Law has passed the Massachusetts Legislature (May 29, 1872) prohibiting the use of oil below 300° fire test, instead of 110° as heretofore. The

Mineral Sperm Oil

meets the requirements of this law. It is now used by **all the Roads leading from Boston,** and by many other Roads, and by a large number of **Pullman's Palace Cars,** in the place of kerosene or candles.

THE LIGHT IS EQUAL TO KEROSENE

and the expense not half that of candles.

To use this oil in our common car lamps, now in use in all parts of the country, it is only necessary to **Change the Burner,** (costing about 50 cents per lamp.) For new lamps, in place of candles, send for lithograph and price-list. This oil is 55 cents per gallon in Boston, New-York, Pennsylvania, etc.

WILLIAMS, PAGE & CO., Boston, Mass.,

Manufacturers of Car Lamps and Car Candle-Lamps, and dealers in Mineral Sperm-Oil and Car Candles.

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Chesapeake & Ohio	T. J. Hamer		Huntingdon, W. Va.
Cheraw & Darlington	D. W. Haines		Florence, S C.
Champlain Trans. Co.	H. T. Calder		Burlington, Vt.
Cheshire & Ashuelot	F. A. Perry	F. A. Perry	Keene, N. H.
Charlotte, Columbia & Augusta	Robert King	J. Q. Leats	Columbia, S. C.
Chicago & North-western		Thomas Hull	Chicago, Ill.
Wiscon. Mad. & Mill. Divis		Henry Hull	Fond du Lac, Wis.
Galena Division	R. W. Bushnell	Hugh Gray	Chicago, Ill.
Chicago Division	T. B. Tilton		
Iowa Division	C. C. Elliott	William Campbell	Clinton, Iowa.
Peninsula Division	S. L Pierce		Escanaba.
Chicago & Alton	John A. Jackman	R. Reniff	Bloomington, Ill.
Chicago, Burlington & Quincy	C. F Jauriet	W. W. Wilcox	Aurora, Ill.
Chicago, Cincinnati & Louisville	C. F. Kidder	D. B Howe	La Porte, Ind.
Chicago, Rock Island & Pacific	T. B. Twombly	B. K. Verbryck	Chicago, Ill.
Chicago, Michigan & Lake Shore	E. I. Reynolds		St. Joseph, Mich.
Chicago, Danville & Vincennes	J. A. Wood		Momencee, Ill.
Cleveland, Col., Cin., & Indianapolis	L. S. Young	William F. Smith	Cleveland, Ohio.
Cleveland and Pittsburg	N. E. Chapman	A. Steinbrunner	Cleveland, Ohio.
Cleveland, Mt Vernon & Delaware	J. W. Holloway	J. W. Holloway	Akron, Ohio.
Cincinnati, Hamilton & Dayton	William Cullen	W. H. Allison	Cincinnati, Ohio.
Cincinnati & Zanesville	Peter Green	D. J. Jewell	Lancaster, Ohio.
Cincinnati & Indianapolis Junction	W. McKinzie	Edwin Beeny	Indianapolis, Ill.
Cincinnati, Sandusky & Cleveland	John Y. Beatty	William Earick	Sandusky, Ohio.
Columbus, Chicago & Indiana Central	(See Pitts. Cinn. & St. Louis)		
Concord	Chs. L. Eastman	M. W. Dickerman	Concord, N. H.
Concord & Claremont	J. N. Lander	A. Langmaid	Concord, N. H.
Connecticut River	John Mulligan	R. Hitchcock	Springfield, Mass.
Contoocook River			Concord, N. H.
Conn. & Passumpsic Rivers	Horace Alden	Horace Alden	Lyndon, Vt.
Cumberland Valley	A. S. Hull	C. W. Nitterhouse	Chambersburg, Pa.
Cumberland & Pennsylvania	W. L. Jordan	J W. Sauerbach	Mt. Savage, Md
Central of Georgia	B. Boulineau	C. C. Millar	Savannah, Ga
Central of New-Jersey	*T. W. Peeples	George Hackett	Elizabethport, N. J.
Central Branch Union Pacific	Wm. D. Rowley		Atchison, Kansas.
Central R. R. of Iowa	W. J. Ribley	W. J. Ribley	Eldora, Iowa
Central Pacific	A. J. Stevens	Benjamin Welch	Sacramento, Cal.

D

Dayton & Union	A. J. Keenan	J. F. Feicht	Dayton, Ohio.
Danbury & Norwalk	Charles A. Craig		Danbury, Ct.
Dayton & Michigan	William Cullen,	W. H. Allison	Cincinnatti, Ohio.
Delaware, Lackawanna & Western	Walter Dawson	Robert McKenna	Scranton, Pa
Des Moines Valley	James Lamb	R. E. Smith	Keokuk, Iowa.
Detroit & Milwaukee	B. Briscoe	B. Briscoe	Detroit, Mich.
Delaware & Hudson Canal Co	James Dickson	Thomas Orchard	Carbondale, Pa.
Dorchester & Delaware			Cambridge, Md.
Dubuque South western	J. M. Williamson		Dubuque, Iowa.
Dutchess & Columbia	W. G. Vanbuskirk	H. A. Webster	Fishkill, N. Y
Dunkirk, Warren & Pittsburg	Joseph Haggart	Joseph Haggart	Dunkirk, N. Y.

E

Eastern		J. P. Somerby	Salem, Mass.
Eastern	John Thompson		East-Boston, Mass.
East-Tennessee & Virginia	Eli Hixon	Jos. Armbruster	Knoxville, Tenn.

* Mechanical Engineer.

Railroad.	*Master Mechanic.*	*Master Car-Builder.*	*Residence.*
East-Tennessee & Georgia	Eli Hixon		Knoxville, Tenn.
East Pennsylvania	J. M. Geary	Samuel Reeves	Reading, Pa.
Elizabethtown and Paducah		T. A. Cordrey	Elizabethtown, Ky.
Erie Railway	*E. O. Hill		Susquehanna, N. Y.
Erie Railway	James B. Gregg		
Erie Railway	H. L. Brown	C. A. Smith	Jersey City, N. J.
Erie Railway	M. E. Brown	M. Wilder	Buffalo, N. Y.
Erie Railway	W. E. Cooper	W. E. Cooper	Hornellsville, N. Y.
Erie Railway		W. E. Rutter	Elmira, N. Y
Evansville & Crawfordsville	John L. White	A. Sharra (fore'n)	Evansville, Ind.
Evansville, Henderson & Nashville	Jos. Crawford	W. H. H. Price	Henderson, Ky
European & North Am. (of Maine)	A. O. Bailey	J. H. Brown	Oldtown, Maine.
Erie & Pittsburg	John Young	John Young	Erie, Pa.
Eldora			Dubuque, Iowa.

F

Flushing & North Side			
Florida	A. W. Taylor	G. Hernandez	Fernandina, Fla
Flint & Pere Marquette	Sanford Keeler	Sanford Keeler	East-Saginaw, Mich.
Fitchburg	Geo. A. Cooledge	Enos Varney	Charlestown, Mass.
Fitchburg & Worcester	John Webster	Samuel Stevens	Fitchburg, Mass.

G

Grand Trunk	†Richard Eaton	J. W. W. McWood	Montreal, Canada.
Grand Trunk		Howard Fry	Sherbrooke, Can.
Grand Trunk		B. J. Mitchell	Portland, Me.
Galveston, Houston & Henderson	Wm. Macbeth	Wm. Macbeth	Galveston, Texas.
Grand River Valley		James Potts	Jackson, Michigan.
Grand Rapids & Indiana			Fort Wayne, Ind.
Great Western of Canada	†Wm. A. Robinson	F. Childs	Hamilton, Canada.
Georgia	William Hardman	T. M. Preval	Augusta, Ga.
Greenville & Columbia	J. T. Price	J. T. Price	Helena, S. C.

H

Harlem Extension	George W. Blanchard		Rutland, Vt.
Harlem Extension		C. S. Clapp	Bennington, Vt.
Hanover Branch	John J. Bingley	Henry Britcher	Hanover, Pa.
Hartford & New-Haven	John O. Chapman	F. Leppense	Hartford, Ct.
Hannibal & St. Joseph	H. A. Towne	H. C. Whiting	Hannibal, Mo.
Hartford, Providence & Fishkill	Edwin Garfield	V. D. Perry	Hartford, Ct.
Hackensack & New-York	Abra'm Angausen		Hackensack, N. J.
Hastings & Dakota	C. C. Clements		Hastings, Minn.
Housatonic	C. R. Morris	J Ferris	Bridgeport, Ct.
Houston & Texas Central	George Stevens	George Stevens	Houston, Texas.
Houghton & Ontonagon			L'Anse, Mich.
Houston Tap & Brazoria	A. Malsch	R. H. Yeomans	Houston, Texas.
Huntington & Broad-Top Mountain	D. G Gilchrist	M. Tellerhoof	Saxton, Pa.
Hempfield	T. Marsh		Wheeling, Va.
Houston & Great Northern	T. W. Shellhorn	T. W. Shellhorn	Houston, Texas.

I

Indianapolis, Cincinnati & Lafayette			Cinncinati, Ohio.
Indianapolis, Peru & Chicago	John McKenna	John McKenna	Peru, Ind.
Illinois Central	†S. J. Hayes	H. O. Wadlie	Chicago, Ill.
Chicago Division	George Holton		Chicago, Ill.
South ivision	David Oxley		Centralia, Ill.
North Division	J. B. Edams		Amboy, Ill
Iowa Division	Thomas W. Place		Waterloo, Iowa.
Iowa & Missouri State Line			Farmington, Iowa
Iron	Perry Scott	Clem. Roetling	Ironton, Ohio.
Indianapolis & St. Louis	T. F. Sechler	C. E. Benton	Mattoon, Ill.
Indianapolis, Bloomington & Western	J. T. Otis	S. S. Smith	Urbana, Ill.
Ionia & Lansing	H. Loughlin		Lansing, Mich.

J

Jeffersonville, Madison & Indiana	Reuben Wells	John Higgins	Jeffersonville, Ind.
Jackson, Lansing & Saginaw	Andrew Wilson	A. Wilson	Jackson, Michigan.

K

Keokuk & St. Paul	P. R. Sutton	Wm. McElroy	Keokuk, Iowa.
Knox & Lincoln			Bath, Maine.
Kentucky Central	J. R. Ledyard	J. L. Hackenthorn	Covington, Ky.
Knoxville & Charleston			Knoxville, Tenn.
Kansas Pacific	L. H. Waugh		Wyandotte, Kansas.
Kalamazoo, Allegan & Grand Rapids			Kalamazoo, Mich.
Kansas City, St. Joseph & Council Bluff	H. L. Cooper	H. L. Cooper	St. Joseph, Mo.

L

Lake Erie & Louisville	John Pero		Fremont, Ohio.
Lake Superior & Mississippi	W. McFarland	A Coburn	St. Paul, Minn.
Lackawanna & Bloomsburg	Chas. Graham		Kingston, Pa.
Lehigh Valley	J. Kinsey		South Easton, Pa.
Lehigh Valley	P. Hofecker	E. R. Brown	Weatherly, Pa.
Lehigh Valley	A. Mitchell	Mauch Chunk, Pa.	Delano, Pa.
Lehigh Valley	D. Clark		Hazelton, Pa.
Lehigh & Susquehanna	L. C. Brastow	L. C. Brastow	Wilkesbarre, Pa.
Lehigh & Susquehanna	Wm. H. Brown		Mauch Chunk, Pa.
Leavenworth, Lawrence & Gal	S. M. Philbrick		Lawrence, Kansas.
Little Rock & Fort Smith	A. Klohs		Little Rock, Ark.
Little Miami	J. H. Setchel.		Cincinnati, Ohio.
London & Port Stanley			London, C. W.
Louisville, New-Albany & Chicago	Jacob Losey	Jacob Losey	New-Albany, Ind.
Long Island	Chs. A. Thompson	B. T. Little	Hunter's Point, L I.
Louisville, Cincinnati & Lexington	John Skidmore	S. S. Pilson	Louisville, Ky.
Louisville & Nashville	Thatcher Perkins	Thatcher Perkins	Louisville, Ky.
Clarksville Division	Jas. Montgomery		Bowling Green, Ky.
Lake Shore & Michigan Southern	*James Sedgley	‡John Kirby	Cleveland, Ohio.
Michigan Southern Division	William Hill		Elkhart, Ind.
" " "		S. S. Knapp	Adrian, Mich.
Toledo Division	Geo. H. Tier	Frank O. Bray	Norwalk, Ohio.
Erie Division	L. O. Gassett	J. Withyecombe	Cleveland Ohio.
Buffalo Division	B. H. Kidder	D. Sutherland	Buffalo, N. Y.

M

Marquette & Ontonagon	A. P. Burroughs	H. D. Lyons	Marquette, Mich.
Macon & Augusta			Macon, Ga.
Maine Central	J. W. Philbrick	J. W. Philbrick	Waterville, Me.
Macon & Western	D. M. Gogul	James A. Knight	Macon, Ga
Manchester & Lawrence	Edward Studley	M. W. Dickerman	Concord, N. H.
Macon & Brunswick	M. Thornton	M. Thornton	Macon, Ga.
Maysville & Lexington			Maysville, Ky.
Marietta & Cincinnati	E. Bosley	E. Bosley	Chillicothe, Ohio.
Memphis & Little Rock	N. Greener	C. W. Wooldridge	Huntsville, Ark.
Memphis & Charleston	Michael Burk	A. W. Drew	Memphis, Tenn.
Memphis & Charleston	L. M. Sellars.	Fabien Varin	Huntsville, Ala.
Miami, Col. & Xenia	J. H. Setchel	M. P. Ford	Cincinnati, Ohio.
Mineral Point	Robert Hay		Mineral Point, Wis.
Mississippi & Tennessee		Henry Teague	Memphis, Tenn.
Mississippi Central	Henry Gibbon	John E. Becton	Water Valley, Miss.
Maryland & Delaware	Samuel Peters		Greensboro, Md.

* General Master Mechanic. † Mechanical Superintendent.
‡ General Master Car-Builder.

Railroad.	*Master Mechanic.*	*Master Car-Builder.*	*Residence.*
Mississippi, Gains. & Tus			Gainsville, Ala.
Midland Pacific			Nebraska City, Neb.
Milwaukee & St. Paul	T. S. Davis	Wm. E. Kettridge	Milwaukee, Wis.
Milwaukee & St. Paul		John Baillie	Milwaukee, Wis.
Milwaukee & St. Paul	J. Pattee	D. F. Wilson	Minneapolis, Minn.
Michigan Central	A. S. Sweet, Jr	J. B. Sutherland	Detroit, Mich.
Montgomery & West-Point	J. McVey	W. H Daniels	Montgomery, Ala.
Montgomery & Eufaula	James McCann	I. E. Holmes	Montgomery, Ala.
Mobile & Montgomery	James McFarland	L. Barham	Montgomery, Ala.
Mobile & Girard	William Eyles	A. J. Nix	Girard, Ala.
Mobile & Ohio	L. J. Fleming	John McHugh	Mobile, Ala.
	B. S. Skates	B. S. Skates	Whistler, Ala.
Missouri River, Fort Scott & Gulf	John S. McCrum		Kansas City, Mo.
Missouri, Kansas & Texas	C. T. McIlvaney	J. Townsend	Sedalia, Mo.

N

Nashville & Chattanooga	John U. Eastman	J. G. Sawyer	Nashville, Tenn.
Nashville & Decatur	C. B. Knowles	C. B. Knowles	Nashville, Tenn.
New-Bedford & Taunton	Robert Chase	Robert Chase	New-Bedford, Mass.
New-Canaan			New-Canaan, Ct.
New Brunswick & Canada	T. Armstrong	T. Armstrong	S'nt Andrew's N.B
New-Haven & Northampton	Henry Fox	Henry Fox	Westfield, Mass.
New-York & Harlem	Wm. M. Strong	Leander Garey	New-York.
New-YorkCentral & Hudson River	G. B. Van Vorst		Albany, N. Y.
New-York Central & Hudson River	Henry Watkeys		Syracuse, N. Y.
New-York Central & Hudson River	Amos Gould		Rochester, N. Y.
New-York Central & Hudson River		Wm. Johnson	Buffalo, N. Y.
New-York Central & Hudson River	Wm. Buchanan	John McKenna	New-York.
New-York Central & Hudson River	John Dikeman		East-Albany, N. Y.
New-York Central & Hudson River		Joseph Jones	West-Albany, N. Y.
New-York Central & Hudson River	*C. T. Ham		Rochester, N. Y.
New-York & Oswego Midland	Wm. H. Griggs	Wm. H. Griggs	Oswego, N. Y.
New-York, Providence & Boston	Jas. H. Anderson	Jas. H. Anderson	Providence, R. I.
New-York & New-Haven	H. Kittendorf	M. C. Andrews	New-Haven, Ct.
New-London Northern	J. W. Dow	S. W. Caulkins	New-London, Ct.
New-Jersey & Transportation Co	John Headden	David H. Baker	Jersey City, N. J.
New-Jersey Midland	J. E. Wiggins	J. E. Wiggins	Godwinsville, N. J.
New-Jersey Southern	Rufus Blodgett		Manchester, N. J.
New-Haven & Derby			New-Haven, Ct.
New-Orleans, Opelousas & Gt. Western	John McCluskey	Matthew Nolan	Algiers, La.
New-Lisbon			Leetonia, Ohio.
New-Orleans & Ohio	John R. Jordan	John R. Jordan	Paducah, Ky.
New-Orleans, Jackson & Gt Northern	John Conlon	Charles Bartine	New-Orleans, La.
New-Haven, Hartford & Springfield			Hartford, Ct.
Naugatuck		George W. Gray	Bridgeport, Ct.
Newark & Bloomfield	Luke F. Tronson		Hoboken, N. J.
Nova Scotia	W. Johnson		Bedford, N. S.
North-Carolina	Rufus D. Wade	B G. Sergeant	Co. Shops, N. C.
New-Orleans, Mobile & Texas	Josiah Bettis	Josiah Bettis	Mobile, Ala
Northern Central	C. M. Lewis		Baltimore, Md.
Northern Central		G. W. Demarest	York, Pa.
North-Lebanon		Henry B. Oves	Lebanon, Pa.
North-Pennsylvania	Franklin Roop	Franklin Roop	Philadelphia, Pa.
North-Eastern	D. W. Haines	A. M. Corrie	Florence, S. C.
Northern	James W. Lander	Albert Langmaid	Concord, N. H.
Northern of New-Jersey	T. W. Demorest		New-York.
Norwich & Worcester	Richard Colburn	G. R. Bentley	Norwich, Ct.
Northern of Canada	James W. Forster		Toronto, Can.
Norfolk & Petersburg	J. S Whitworth	J. S. Whitworth	Norfolk, Va.
Northern Pacific		†Geo. W. Cushing	St. Paul, Minn.

O

Ogdensburg & Lake Champlain	William A. Short	J. R. Ames	Malone, N. Y.
Old Colony & Newport	J. K. Taylor	A. Gleason	Boston, Mass.
Orange, Alexandria & Manassas	James E. Waddy	John T. Nalls	Alexandria, Va.
Oil City & Pithole	George Thompson		Pithole, Pa.
Oil Creek & Alleghany River	J. S. McElroy	Jacob Williams	Corry, Pa.
Oil Creek & Alleghany	H.J.Bookhammer	John Monks	Oil City, Pa.
Ohio & Mississippi	*F. J. Roth	M. Contant	Cochran, Ind.
East Division	A. Thompson		Cochran, Ind.
West Division	H. Elliott		East St. Louis, Ill.

P

Panama	Chas. E. Stewart	J. G. Wilson	Aspinwall, N. G.
Pacific of Missouri	E. B. Gibbs	E. B. Gibbs	St Louis, Mo.
Pennsylvania	†G. C. Gardner		Altoona, Pa.
Pennsylvania	H. D. Garrett	I. W. Van Houten	W. Philadelphia, Pa.
Pennsylvania	E. L Caum	Samuel W. Myers	Harrisburg, Pa.
Pennsylvania	G. W. Strattan	John P. Levan	Altoona, Pa.
Pennsylvania	D. O. Shaver	R. S. Ramsey	Pittsburg, Pa.
Philadelphia & Erie	Martin Walls	George J. Mason	Sunbury, Pa.
	W. L Foster	Robt M.Messimer	Renovo, Pa.
	W. L. Holman	Wm. P. Newcomb	Kane, Pa.
	W. T. Smith	David Cowley	Erie, Pa.
Philadelphia, Wilmington & Baltimore	George W. Perry	George W. Perry	Wilmington, Del.
Philadelphia & Reading	L. B. Paxson	Aaron Steinbach	Reading, Pa.
Philadelphia, Germ'n & Norris'n	John Moyer	Nathan Pawling	Philadelphia, Pa.
Philadelphia & Baltimore Central	S. D. Danfield	SamuelD.Danfield	Chester, Pa.
Pittsburg, Cincinnati & St. Louis	James Ball	James Ball	Logansport, Ind.
	Robert Curtis	Theo. Chamberlain	Columbus, Ohio.
	Thomas Denmead		Dennison, Ohio.
	Thomas V. Losee	John Gottschall	Indianapolis, Ind.
		James McGee	Steubenville, Ohio.
Peoria & Rock Island	Theo. Mosher		Peoria, Ill.
Pittsburg, Fort Wayne & Chicago	S. M. Cummings	John Marquis	Alleghany, Pa.
Pittsburg, Fort Wayne & Chicago	J. M. Boon		Fort Wayne, Ind.
Pittsburg & Connellsville	D. P. Rennie	J. M. Rutter	Connellsville, Pa.
Peoria, Pekin & Jacksonville	R. F. Hurd	R. F. Hurd	Pekin, Ill.
Peninsular	T. G. Templeton		Battle Creek, Mich
Portland & Rochester	John G. Brady	John G. Brady	Portland, Me.
Portland & Kennebec	John Ellis	J. W. Trussel	Augusta, Me.
Portland & Oxford Central	Geo. W. Battles	Geo. W. Battles	Buckfield, Me.

* Mechanical Superintendent. † Superintendent of Motive Power and Machinery

Railroad.	*Master Mechanic.*	*Master Car-Builder.*	*Residence.*
Portland, Saco & Portsmouth	John Donnell		Portland, Me.
Port Royal			Beaufort, S. C.
Port Hope, Lindsay & Beaverton	H. G. Taylor	H. G. Taylor	Port Hope, Can.
Port Huron & Lake Michigan	R. C. Stewart	R. C. Stewart	Port Huron, Mich.
Providence, Warren & Bristol	Rufus Smith	J. Brightman	Bristol, R. I.
Portsmouth, Gt. Falls & Monmouth	James Tucker	E. Fall	Union Village, N.H.
Petersburg	R. B. Adams	Alex. Wright	Petersburg, Va.
Providence & Worcester	Joseph Kelly	Olney L. Smith	Providence, R. I.
Poughkeepsie & Eastern	John L. Driscoll	John L. Driscoll	Poughkeepsie, N. Y.

R

Raleigh & Gaston	J. B. Gayle	J. B. Gayle	Raleigh, N. C.
Rensselaer & Saratoga	W. B. Gage		Troy, N. Y.
Richmond, Fredericksburg & Potomac	H. Kuhn	W. H. Trainham	Richmond, Va.
Richmond Danville & Piedmont	John McFarland	H. Longest	Richmond, Va.
Richmond & Petersburg	John O'Brien	J. J. Martin	Richmond, Va.
Richmond & York River	C. H. Harris	J. L. Thompson	Richmond, Va.
Rome, Watertown & Ogdensburg	Wm. Jackson	H. H. Sessions	Rome, N. Y.
Reading & Columbia	B. Van Lew		Columbia, Pa.
Rome, Georgia	O. W. Harbin	O. W. Harbin	Rome, Ga.
Rochester & Genesee Valley	M. E. Brown	M. Wilder	Buffalo, N. Y.
Rockford, Rock Island & St. Louis	R. D. Grant		Beardstown, Ill.
Rutland	N. L. Davis	N. B. Allen	Rutland, Vt.

S

San Francisco & San José	R. B. Bishop	Frank Bellisle	San Francisco, Cal.
St. Croix & Lake Superior			New-York City.
St. Croix & Penobscot	Edward Bolton	A G. Page	Milltown, Me.
St. Lawrence & Ottawa	Calvin Dame	Calvin Dame	Prescott, Canada.
St. Louis & Iron Mountain	O. A. Haines	Oscar Doolittle	Carondelet, Mo.
Sandusky, Mans. & Newark		Charles Scoeby	Sandusky, Ohio.
St. Joseph & Denver City	E. Sleppy		Elwood, Kan.
San Antonio & Mexican Gulf	W. T. Bingham		Victoria, Texas.
South Side of Long Island	A. P. Doane	M. Heitzman	Williamsburg, L. I.
St. Paul & Sioux City	Jas. G. Butterfield		Shakopee, Minn.
St. Louis, Vandalia, T. Haute & Ind	C. R. Peddle	H. Kermise	Terre Haute, Ind.
South-Carolina	W. B. Smith	John Reed	Charleston, S. C.
South-Side of Virginia	J. T. Robinett	J. T. Robinett	Petersburg, Va.
South & North-Alabama	Tho. Jeffries	Tho. Jeffries	Lime Station, Ala.
Southern Central	C. G. Brown		Auburn, N. Y.
Southern Minnesota	Wm. Lininger		Wells, Minn.
Southern of Canada	Albert Congdon	Albert Congdon	Fort Erie.
South-Western of Georgia	C. D. Wall		Columbus, Ga.
South-Western of Georgia	D. M.Gogul	James A. Knight	Macon, Ga.
South Shore	Warren E. Ray		Cohasset, Mass.
Stanstead, Shefford & Chambly	W. H. Smith	M. Sessions	Waterloo, C. E.
Schuylkill & Susquehanna	John E. Wootten	John E. Wootten	Reading, Pa.
Seaboard & Roanoke	J. B. Pendleton	J. B. Pendleton	Portsmouth, Va.
Stonington & Providence	J. H. Anderson	J. H. Anderson	Providence, R. I.
Selma & Gulf	Wm. T. Daughtrey		Selma, Ala.
Selma, Rome & Dalton	A. G. Maynes	W. W. Peirce	Selma, Ala.
Sioux City & Pacific	Charles Foster	J. R. Dow	Missouri Val., Iowa
Spartanburg & Union	J. N. Benner	Jacob Rice	Union C. H., S. C.
Sheboygan & Fond du Lac	J. H. Erwin	J. H. Erwin	Sheboygan, Wis.
Sullivan & Erie			Tonawanda, Pa.
Syracuse & Binghamton, N. Y	B. G. Merrill	B. G. Merrill	Syracuse, N. Y
Sycamore & Cortland			Sycamore, Ill.
St. Louis & South-Eastern	C. B. Salisbury		Mt. Vernon, Ill.
St. Louis, Kansas City & Northern	John Calhoun	C. S. Buck	St. Louis, Mo.

T

Taunton Branch			Taunton, Mass.
Tioga	Peres Bonny	D. H. Stratton	Blossburg, Pa
Texas & New-Orleans	R. B. Baer		Houston, Texas.
Tennessee & Pacific	William McKeand	William McKeand	Nashville, Tenn.
Toledo, Wabash & Western	W. F. Ray		Fort Wayne, Ind.
Toledo, Wabash & Western		David Hoit	Toledo, Ohio.
	T. G. Gorman		Springfield, Ohio.
Toledo, Peoria & Warsaw	A. H. De Clerq	R. M. Hemphill	Peoria, Ill.
Troy & Boston	Foster Church	R. V. Coon	Troy, N. Y.
Toronto, Grey & Bruce			Toronto, Can.

U

Union Pacific	I. H. Congdon	Geo. E. Stevens	Omaha, Nebraska.
Utica & Black River	John Bailey	David James	Utica, N. Y.
Utica, Chenango & Susquehanna	C. H. Brown		Utica, N. Y.

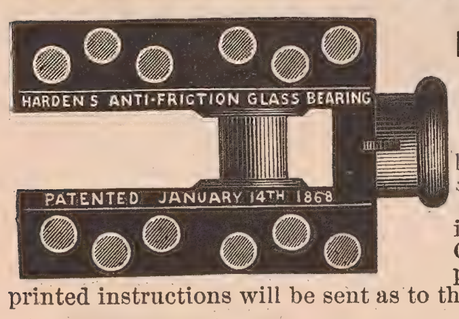
V

Virginia & Tennessee	F. Sterk	W. A. Morgan	Lynchburg, Va
Vicksburg & Meridian	Jas. B. Brown		Vicksburg, Miss.
Vineland			Vineland, N. J.
Vermont Central	J. M. Foss	Milton Sessions	St. Albans, Vt.
Vermont & Massachusetts	D. T. Davis	Jacob Marsh	Fitchburg, Mass.

W

Wicomico & Pocomoke			Berlin, Md.
Wilmington, Charlotte & Rutherford	W. A. Gill	Thomas Myers	Laurenburg, N. C.
Wilmington, Columbia & Augusta	George Hall	W. J. Calais	Wilmington, N. C.
Westchester & Philadelphia	John Moyer	N. Pawling	Philadelphia, Pa.
Wilmington & Weldon	John Bissit	John Bissit	Wilmington, N. C.
West-Jersey	W. McAllister	C. C. Williams	Camden, N. J.
Western Maryland	R. V. Dohoney	J. H. Nussear	Union Bridge, Md.
Winona & St. Peter	F. C. Ford	H. L. Preston	Winona, Minn
Western North-Carolina	E. H. Marsh	E. H. Marsh	Salisbury, N. C.
Western R. R. N. C	M. W. Atkinson	M. W. Atkinson	Fayetteville, N. C.
West-Feliciana	R. C. Brower		Woodville, Miss.
Western & Atlantic	John H. Flynn	John Sherman	Atlanta, Ga.
Worcester & Nashua	George H Griggs	George H. Griggs	Worcester, Mass.
Welland	William Wells	William Pay	St. Catharine, C. W.
Washington & Ohio	Nathaniel Hayes	Joshua Hamson	Alexandria, Va.

HARDEN'S
Anti-Friction Glass Bearings,



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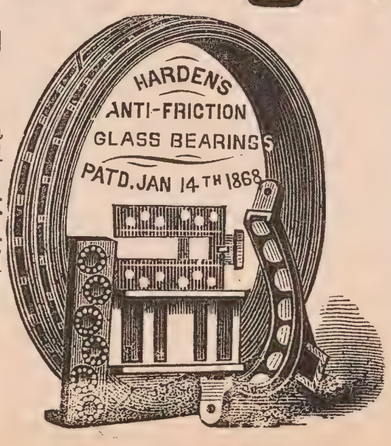

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Erie Car-Works	Erie, Pa.
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Fremont Car Co	Fremont, Ohio.
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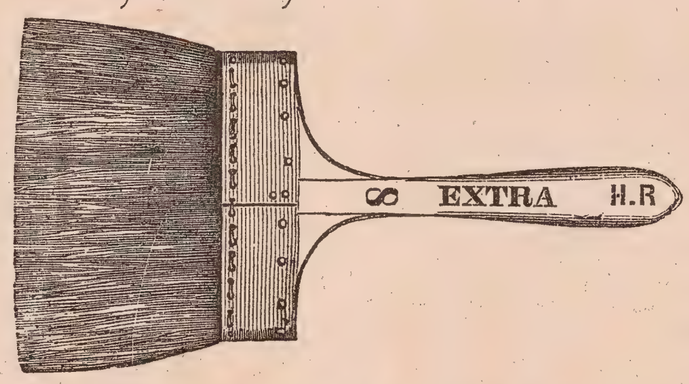

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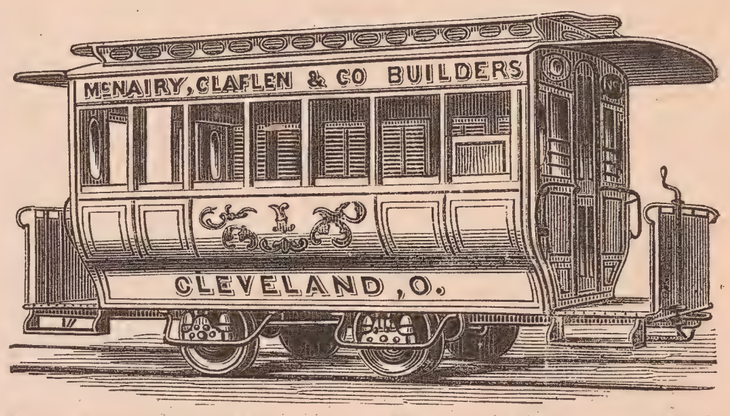

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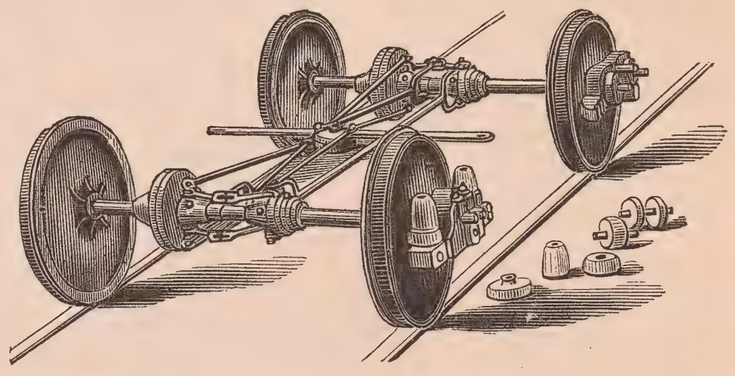

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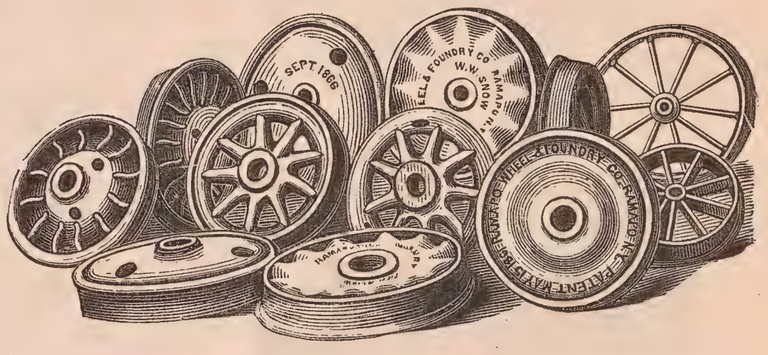

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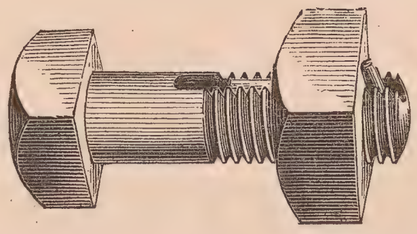
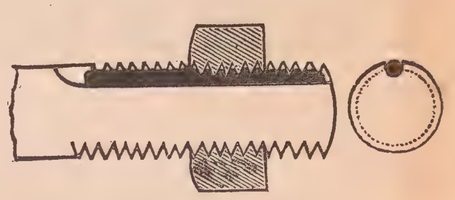


"CUMMING NUT-LOCK,"
Patented
June 16, 1868,
August 23, 1870.



SECTIONS.

Unequaled for CHEAPNESS, SIMPLICITY & EFFECTIVENESS.

This simple device, as will be seen by the engravings, consists of a groove being cut in the threaded part of a screw bolt into which is placed a key of copper wire, or other soft metal; when the nut is screwed on, it cuts a thread on the key, thereby making it impossible for the key to get out until the nut is taken off. When the nut is screwed up to its place, that part of the key over which the nut has passed is riveted up against the nut with a small punch, destroying the thread on the key. The nut, therefore, can not move backward until force is used, as with a wrench.

The groove can be rapidly cut with a simple machine designed for the purpose.

Experience has proved this device absolutely reliable, and it is the cheapest of all known devices for the purpose. By its use, old bolts on which the nuts have become too slack for use can be made as good as new, making it a great saving to railroad companies and others in that item alone. It is cheaper than a check-nut.

If the bolt should become slack from shrinking of timber or other causes, *the nut will always remain firmly attached to the bolt*, and, with the wrench, can be screwed up *any distance*, and the wire riveted up any number of times, or can be taken off without injury to the nut or bolt.

This is the only method in use that locks the nut firmly to the bolt without regard to place or surroundings, all others require some attachment that holds the bolt in its position, and a washer or other attachment to keep the nut from turning.

DIRECTIONS FOR USE.—Place the copper key in the slot, pointed end out, and beveled side up, in such a position that when the nut is screwed to its place about three-eighths of an inch of the key will project beyond its outer face. Then screw the nut to its place *over the key*, allowing it to cut its own thread in the copper. Then take a narrow flat set punch, and rivet the projecting part of the key *solidly* against the outer face of the nut. To tighten the nut: screw it up, and rivet the key tighter. To remove the nut: simply apply the wrench and unscrew the nut. It will cut its own way out through the copper. The same key can be used several times, by moving it outward a few threads in the slot.

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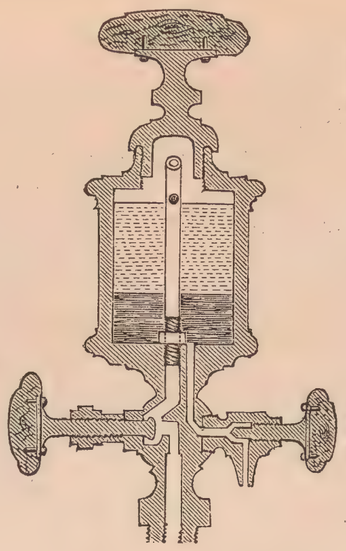

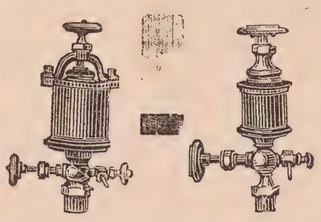

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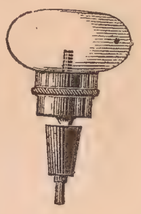

These Oil Cups have a wide renown for their reliability and economy, which makes them the favorite with every Engineer and Mechanic who has them in use. They are made in different styles and sizes, but all work on the great principle of a free and perfectly automatic action on the bearing, and only when the machinery is in motion.

We call particular attention to our

SELF-ACTING LUBRICATORS FOR CYLINDERS.

Their advantages over other lubricators are so striking that it is only a question of time for them to come in general use, their accuracy in keeping the valves and pistons thoroughly and constantly lubricated being unequaled.

The principle of working is based on an intermittent condensation of steam in the *upper part* of the cup containing the lubricant. At every couple of strokes the steam, condensing, produces a drop of water, which, being heavier then the oil, sinks by its own gravity and raises a corresponding drop of oil over into a tube, which arises in the centre of the cup and conveys said oil directly to the chest and cylinder, this tube being the only connection from the lubricator to the internal part of the engine. The water produced by the condensation is drawn off once a day by a side-cock, and the cup filled again with the lubricant. Another advantage is, that the condensing process refines the oil, as the water settling down through the lubricant carries down salts and acids which may be contained therein. In this way corrosion of the steam-chest and cylinder is prevented, the power of the engine improved, and an amount of packing saved.

These lubricators have been adopted on ***thousands*** of stationary and marine engines, steam-pumps, steam fire-engines, and on locomotives by over ***eighty railroads*** in the United States.

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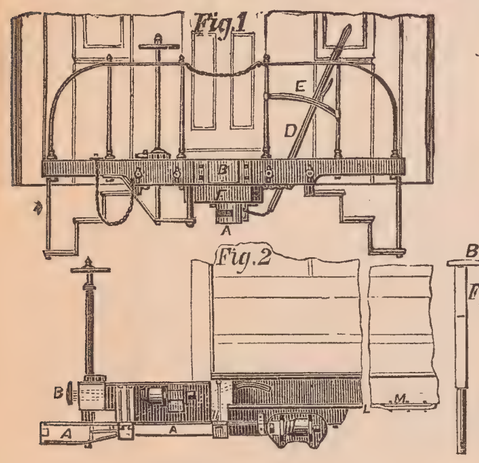
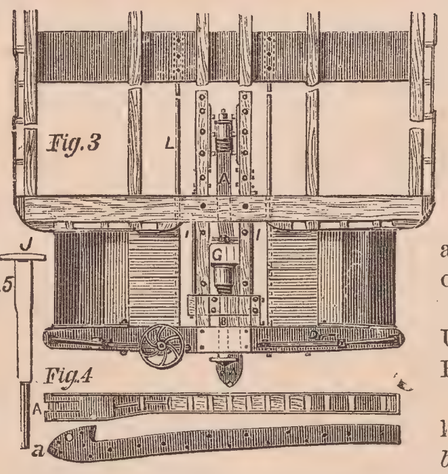
MILLER'S TRUSSED PLATFORMS. Compression Buffers and Automatic Couplers for Railroad Passenger Cars.





Office, 231 Broadway, (Rooms 4 and 5,) New-York.

Send for Illustrated Pamphlet, and call and see working models. **E. MILLER, Patentee.**

DESCRIPTION.

Figure 1 is an elevation; Figure 2, a longitudinal section; Figure 3, a plan of an end of a car to which the arrangement has been applied; and Figures 4 and 5 show top and side views of the "Hook" and "Buffer," drawn on a larger scale than that of Figures 1, 2, and 3.

The letters refer to the same parts in all the figures. A is the coupling "Hook," B the "Buffer," C the "Stop," D the "Lever," E the "Quadrant Ratchet," F the "Truss Beam," G the "Spring Beam," H the "Suspender Beam," I the "Upward Trusses," K the "Main Spring," L the "Downward Trusses," and M the "Bolster."

The Platforms, instead of being located below the centre line of the main sills of the cars, are placed *in* that line, and held there by the Trusses I and L, so that the point of contact (in Buffers B) is *in* the said centre line and *not below* it.

The coupling "Hook" A is attached to the draw spring the same as the ordinary draw head, and at the same height above the track, but in such a manner that the outer end is free to move aterally for a short distance. The Coupling Hook projects beyond the platform. The Stop C is placed under the Buffer Beam to prevent accidental uncoupling. When two cars are brought ogether, the Coupling Hooks, from *their shape*, push each other aside, until the Buffers B are compressed hard on the Buffer Springs, then—*the points of the hooks having passed each other sufficiently far*—the Hooks are carried forward by their main-springs, and thus the "*Coupling*" and "*Compression*" are both effected automatically *and at the same time*, and without the use of links and pins. When two cars are thus coupled together, the *head* of the *Hook* of each car is under the Buffer Beam of its opposite car, and the platforms are close together, (about 4 inches apart.) The effect of this is, *one platform can not be forced over the other*, nor can a *child* fall between the platforms; the dust and rain are nearly all shut out; the "Compression" makes the train run steadily, and prevents all jerking at starting and stopping.

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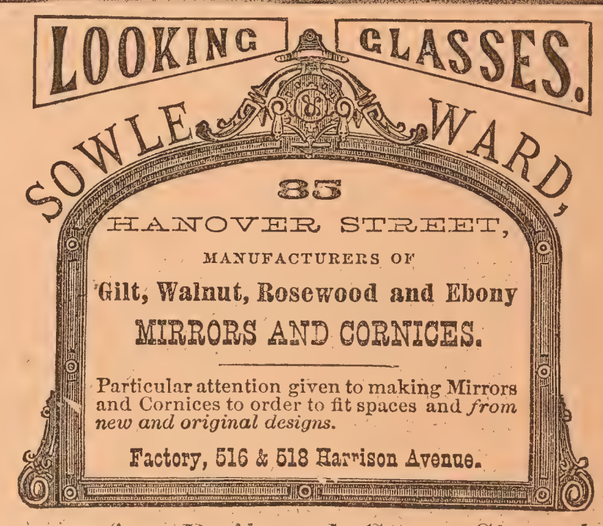
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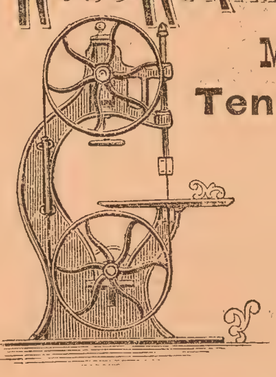

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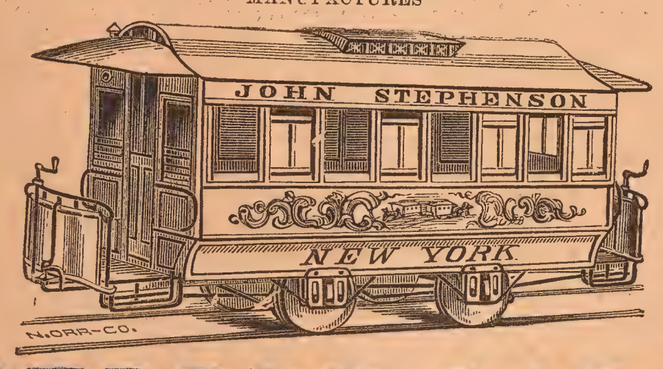

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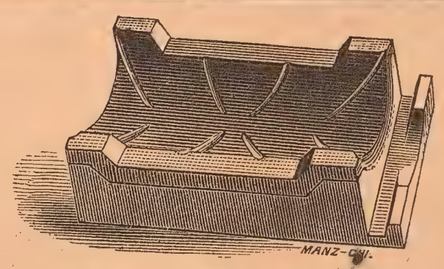

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